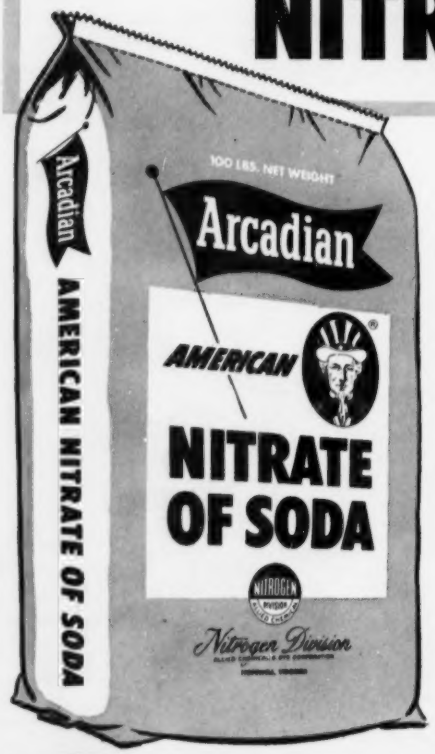
APRIL, 1955

Commercial Fertilizer

and PLANT FOOD INDUSTRY

NEW STYLE AMERICAN NITRATE OF SODA



Best ever produced — New-process ARCADIAN® *American* Nitrate of Soda has the improved physical condition that puts it in the top rank for ready handling and easy spreading.

Big, triple-screened crystals as made by ARCADIAN give your customers all the advantages of 16% quick-acting nitrate nitrogen that is free-flowing in any method of application, and that holds physical condition better in storage. Also provides the benefits of 26% sodium content.

Check Your Stocks NOW!

—make sure you get enough of the improved ARCADIAN *American* Nitrate of Soda, best for you because it's best for your customers. See us now.

Arcadian®

PRODUCTS FOR PROFITABLE FARMING

Nitrogen Solutions
(NITRANA® and URANA®)
AMERICAN
Nitrate of Soda
A-N-L®
Nitrogen Fertilizer
Urea Products
Sulphate of Ammonia

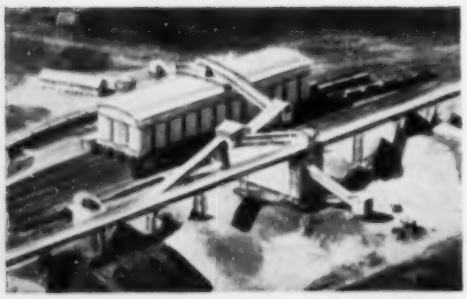
NITROGEN DIVISION ALLIED CHEMICAL

NITROGEN DIVISION Allied Chemical & Dye Corporation
New York 6, N. Y. • Indianapolis 20, Ind. • Hopewell, Va. • Atlanta 3, Ga. • Ironton, O.
Columbia 1, S. C. • Omaha 7, Neb. • San Francisco 3, Cal. • Los Angeles 15, Cal.

Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from 9½ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.

AA Quality...

for over 85 years a symbol of quality and reliability



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

principal AA QUALITY products

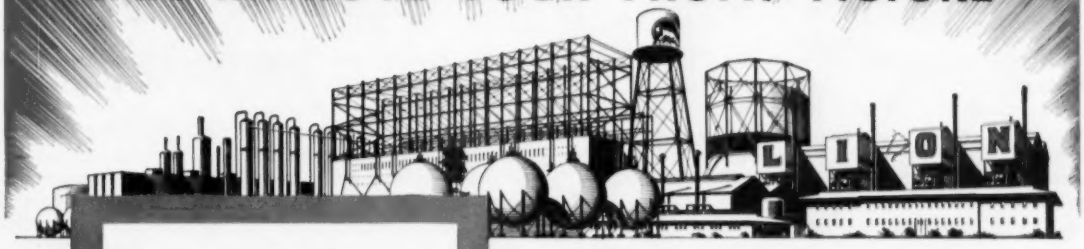
All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
Sulphuric Acid **Fluosilicates** **Insecticides and Fungicides**
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Buying from A LEADER CAN IMPROVE YOUR PROFIT PICTURE



Lion—A Leader in Petro-Chemicals— offers

ONE-STOP SERVICE FOR QUALITY NITROGEN FERTILIZER MATERIALS

Lion Anhydrous Ammonia — For formulation. A uniformly high-quality basic product. Nitrogen content, 82.2%.

Lion Aqua Ammonia—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

Lion Ammonium Nitrate Fertilizer —For formulation or direct application. Improved spherical pellets. Guaranteed 33.5% nitrogen.

Lion Nitrogen Fertilizer Solutions —For formulation. Three types to suit varying weather and manufacturing conditions.

Lion Sulphate of Ammonia — For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

Because of Lion's leadership in nitrogen fertilizer production in the South, Lion can show you the way to MORE PROFITS.

When you buy your complete nitrogen requirements from Lion, you automatically put yourself in a position to improve your profit picture. Here's how:

1. **You Save Time** • You can contract at one time, with a single dependable source, for all of your nitrogen fertilizer material requirements. And, of course, time saved today is reflected in your profits tomorrow.

2. **You Prevent Manufacturing Delays** • Formulation material that does not have consistent quality can slow down or delay your own production needlessly. With Lion's Quality Control, you can be sure of *quality* materials. The difference will show up in your profit column.

3. **You Solve Problems Quicker** • If you run into a formulation snag, Lion's highly trained Technical Staff will be ready to give you the kind of technical assistance that can only come from a leader. This aid can help improve your profit picture . . . and *it's yours for the asking.*

DISTRICT SALES OFFICES: NATIONAL BANK OF COMMERCE BUILDING, NEW ORLEANS, LOUISIANA • SHEPHERD BUILDING, MONTGOMERY, ALABAMA

LION OIL COMPANY

CHEMICAL SALES DIVISION — EL DORADO, ARKANSAS

your eye tells you why

International's New Triple Superphosphate Means

better granulation

Your first glance tells you why the fine, virtually dust-free texture of International's new Triple Superphosphate gives such improved results. It promotes better granulation in your high analysis plant foods — improves product acceptance. It assures thorough and more complete ammoniation; reduces the need to grind before mixing; cuts mixing costs. Proper conditioning before shipment also reduces the problem of setting up en route, for easier, more economical handling — plus high product performance.

International's new Triple Super offers these extra benefits because it's produced by a new process from high quality rock. Result: a high analysis product (46% A.P.A. or better) with the right particle size and correct chemicals structure for best results in making modern plant foods. International's expanded facilities assure a reliable supply of this improved Triple Superphosphate, now available for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

The Nation's Largest Producer of Phosphates • *General Offices: 20 North Wacker Drive, Chicago 6*

FREE...for all your customers

new, full color pamphlets tell how yields can be increased with NITROGEN

● MANY FAILURES to get expected responses from fertilizer applications are caused by lack of balance between nitrogen, phosphorus and potash. No one element can do the job alone. All three are found in the soil, but the one in short supply will limit the yields. Heavy yields require heavy applications of NITROGEN—more than is generally available from organic matter, crop residues, manure and starter fertilizer. Therefore, supplemental nitrogen is essential to profitable production of corn and other crops.

These important facts – and the reasons behind them—are explained, simply and accurately, in the two new pamphlets prepared by United States Steel agronomists.

The pamphlet, "MAKE BIGGER PROFITS WITH USS AMMONIUM SULPHATE" includes profit-building recommendations and remarks on corn and on many other crops as well. The symptoms of nitrogen deficiency and sufficient nitrogen are dramatically compared in full color.

The other color pamphlet, "HOW TO FIGURE NITROGEN FOR BIGGER CORN YIELDS" includes a useful and dependable field worksheet on which the farmer can easily figure his own nitrogen requirements. Starting with his *desired* per acre yield, he can figure the nitrogen he already has and how much more he needs to get the yield he wants.

How many do you want?

This is a first-rate, down-to-earth opportunity to boost your nitrogen sales. Check the number of pamphlets you want on the coupon and we will rush them to you free of charge. Be sure that every customer gets one.

But don't delay . . . the spring fertilizing season is at hand. Mail the coupon today.

USS AMMONIUM SULPHATE

United States Steel
Agricultural Extension Section, Room 4676
525 William Penn Place, Pittsburgh 30, Pa.

Please rush to me, without charge, my copies of your new, full color literature as follows:

____ copies of "Make bigger profits with USS Ammonium Sulphate"
____ copies of "How to figure nitrogen for bigger corn yields"

Name.....
Company.....
Address.....
City..... State.....

USS

UNITED STATES STEEL

Published Monthly by
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President
ERNEST H. ABERNETHY

Editor
BRUCE MORAN

Managing Editor
CLAY W. PENICK, JR.

Business Manager
V. T. CRENSHAW

Chicago Representative
ELON A. ABERNETHY
1200 N. Ashland Ave.—Room 544
Phone CApitol 7-4111

West Coast Representative
M. A. CALDWELL
2267 W. 24th St., Los Angeles, Cal.
Phone REPUBLIC 1-3050

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and PLANT FOOD INDUSTRY

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Commenting Freely

BY BRUCE MORAN

We have preached so often and so long on the need for research and better knowledge of things agricultural, that it was especially interesting to note the rash of agricultural grants-in-aid which have been announced in the last few weeks. Let me take them in order as the news came to this editorial desk:

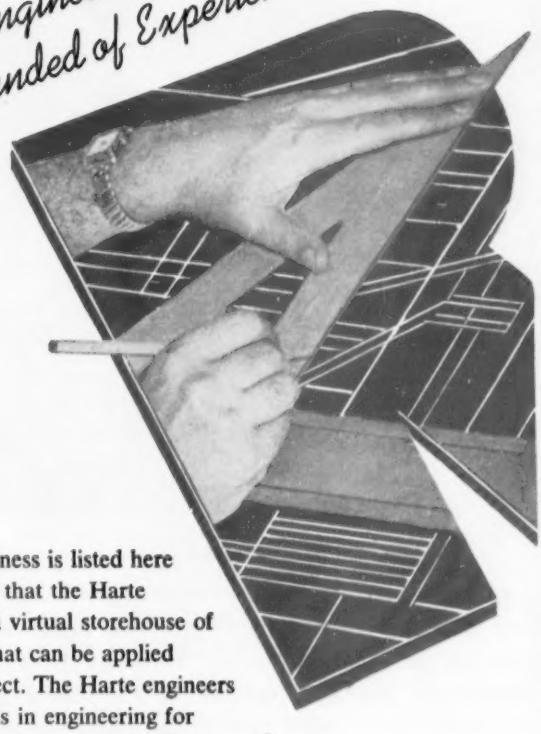
Knoxville Fertilizer offers the "J. H. and J. W. Dean Scholarships" for ag training at the University of Tennessee. Olin Mathieson have granted $5,000 to the University of Arkansas for a study of ammonium phosphate fertilizers. Zonolite has established a graduate fellowship at Clemson (S.C.) for a study of the characteristics of vermiculite. Grace Chemical has allocated $20,000 to seven Land Grant colleges and experiment stations for work on nitrogen plant foods and animal feeds. The Rawlins (Kas.) County Soil Conservation District offers a $200 scholarship to a high school graduate in their county. Southern Dolomite, Palmetto, Fla., has set up a 4-year $400 scholarship. And California Fertilizer Association has set up a $4,000 per year, three-year agreement with the University of California to determine the fertilizer needs of forage and cereal crops.

Remember, these are just those reports which came to us between issues of our magazine. We have no idea of the grand total of such funds—but it must be quite a sum of money, and a tremendous contribution to the world's knowledge. But however large, it is not enough.

The work being done by agronomists in education and in industry is a magnificent total, too . . . but not enough. We have a lot to learn, and the sooner we get at it the better.

Which of these processes fits your need?

Engineering Compounded of Experience



- SINGLE SUPERPHOSPHATE PLANTS
- TRIPLE SUPERPHOSPHATE
- AMMONIUM SULPHATE PLANTS
- NITRIC ACID
- STORAGE BUILDINGS
- NITRIC ACID ACIDULATION
- NITROPHOSPHATE PLANTS
- INSECTICIDE PLANTS
- SULPHURIC ACID
- WAREHOUSES
- PHOSPHORIC ACID
- GRANULATION PLANTS
- FERTILIZER MIXING PLANTS

If your business is listed here you will find that the Harte System has a virtual storehouse of knowledge that can be applied to your project. The Harte engineers are specialists in engineering for the fertilizer industry. Specialists in visualization *and* application. Specialists in handling jobs quickly, economically and efficiently.

The diversified experience and knowledge of our engineers is available to you in planning the design and construction of a raw materials processing plant or a mixing plant. The Harte System can be applied on a specific immediate problem or on over-all broad-range planning. Whatever your fertilizer plant needs, the Harte organization can handle your complete job or any part, from original plans to finished operating plant.

In fertilizer plant planning there is no substitute for experience. Why not call in the Harte organization for a discussion of your plans? There is no obligation, of course.

John J. Harte Company

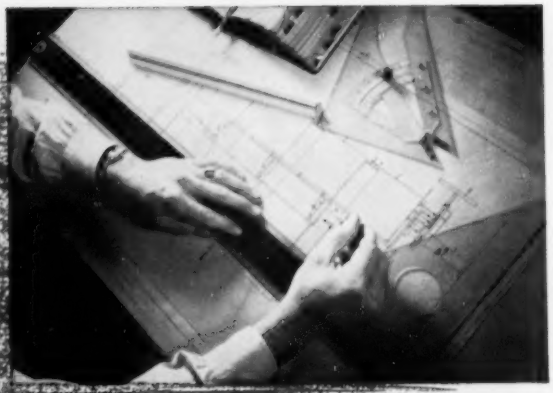
ENGINEERS

CONSTRUCTION MANAGERS

284 TECHWOOD DRIVE, N. W., ATLANTA • NEW YORK • HOUSTON • MEXICO, D. F. • HAVANA • WASHINGTON, D. C.

from the drawing board to complete plant

for complete dry mixing or superphosphate plants



Extensive research and planning are necessary to assure maximum efficiency of a fertilizer plant. Each plant must be individually planned and constructed to meet the specific requirements of the location. Expert supervision must be given to the installation of equipment and construction of the building to realize full operating efficiency. From the original plan to the operating plant, a competent staff, with broad, practical experience, guide your plant through the design, engineering, manufacturing, fabrication and construction phases. Any or all of these services are available to you at one source with Davidson-Kennedy Company. In addition, they stand ready upon completion to train any personnel in plant operation. Davidson-Kennedy Company, manufacturers of a complete line of fertilizer machinery, offer you an engineering service second to none in the industry.

COMPLETE FERTILIZER PLANTS • FERTILIZER MIXING PLANTS

Acidulating Units
Mixing Units
Acid Plant
Granulating Plants
Batching Systems (in line and cluster hoppers)
Continuous Ammoniating Plants

DAVIDSON-KENNEDY CO.

ATLANTA GEORGIA

U.S.A.

EXACT WEIGHT Sacking Scales

Model No. 1120 is a dependable heavy duty scale for manual sacking and checkweighing fertilizers. Short lever fall plus the action of an adjustable damping device bring indicator to rest quickly, and magnified indication makes possible an accurate reading at a glance. Tower revolves to any reading position. Weighing platform is only 6½ inches from floor—minimizes lifting of containers. Open construction permits easy cleaning. Weighs accurately in out-of-level position.

Sack, Weigh and Check Weigh in One Operation

Model No. 2225 is designed for complete sacking operation from overhead hopper or manually. One simple operation does the work of three. One man can bag, weigh and check as much as 100 tons of free flowing material per day. Savings in labor costs plus elimination of overweights can pay for the installation quickly. Just four easy motions to attach bag, fill, weigh and release to conveyor. Write for details on these Exact Weight scales.

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Columbus 8, Ohio

Send full information on sacking scales.

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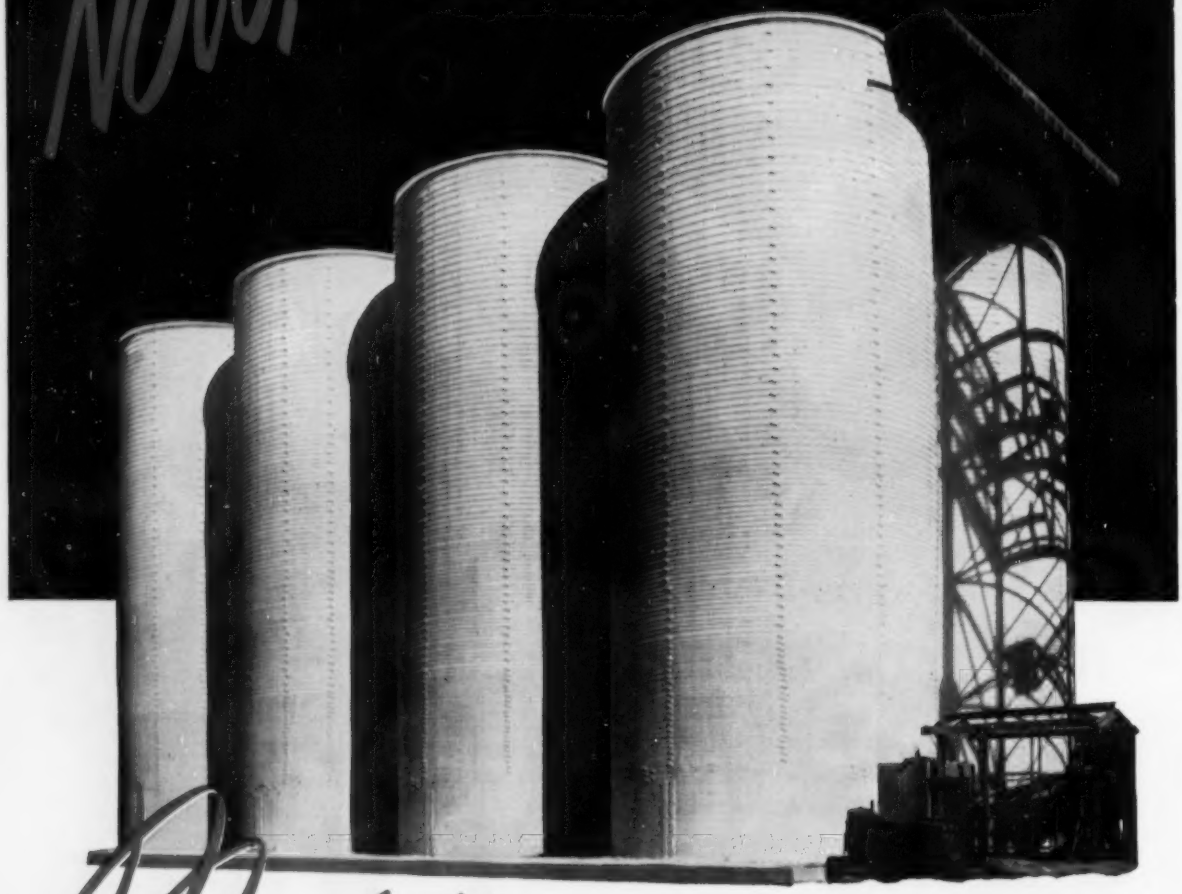
Address .....

City ..... Zone ..... State .....

NOW!

SUPER-SEALED with SILICONES!



Marietta **CONCRETE STORAGE SILOS**

GET GREATER PROTECTION for all your valuable raw materials . . . in powdered, granular or lump form . . . in Marietta Concrete Stave Silos — now coated with miraculous silicones!

Don't risk loss from spoilage or deterioration . . . when expertly-engineered Marietta Industrial Storage Systems provide superior protection . . . and cut wastage! Modern Marietta Concrete Storage Silos built with Air-Cell or solid concrete staves provide three lines of defense against the ravages of moisture and freezing cold . . . heavier, stronger staves, plus flexibility of design . . . and an outside finish coat sealed with an impenetrable film of silicone compound which also prevents staining and efflorescence; insuring you that your Marietta Concrete Storage System will not only look better, but serve you longer!

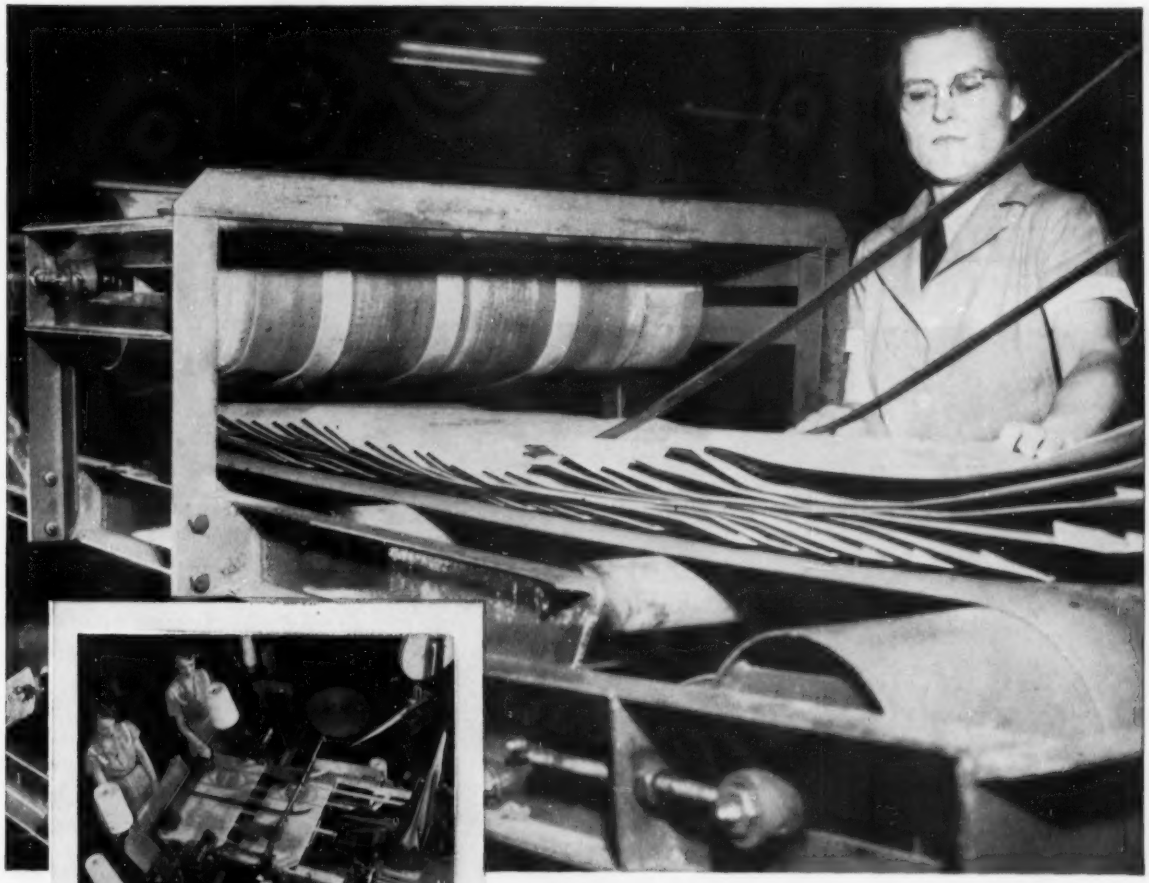
Write for catalog giving details today . . . find out how a Marietta-designed storage system can improve your handling facilities and lower operating costs.

ADDED STRENGTH is provided by full 3⅝" thick precast concrete staves and heavy hooping . . . more than ample to support heavy vibrators, shaker screens and other needed equipment on silo tops or sides . . . where deadweight of silo storage system is a factor, staves may be supplied cast from lightweight aggregate.

THE Marietta *Precast Concrete Products for Farm, Home and Industry*

CONCRETE CORPORATION
MARIETTA, OHIO

BRANCH OFFICES: 501 Fifth Ave., New York 17, N. Y.; Pulaski Hwy. at Race Rd., Baltimore 21, Md.; 411 Foster St., Nashville, Tenn.; Box 5192, Charlotte 6, N. C.; Hollywood, Fla.; Box 592, Jamestown, New York.
REPRESENTATIVES in principal cities.



Experienced inspectors watch every phase of V-C's bag-making operation. Extra care in manufacturing has helped make V-C Bags famous for their toughness and stamina.

After "tubing," V-C Bags are rigidly inspected for proper seam pasting, length and size. Special care is taken to see that all surfaces are absolutely bonded.

V-C® Quality Controls Mean Better Bags for You

Rigid quality controls, top-grade bagging materials, and careful construction give V-C Multiwall Bags the ability to stand rough treatment. V-C Bags are available in various styles and sizes, two-to-six ply, expertly designed and printed to your specifications in one to four colors. Write for full information, or discuss your bag requirements with a V-C representative.

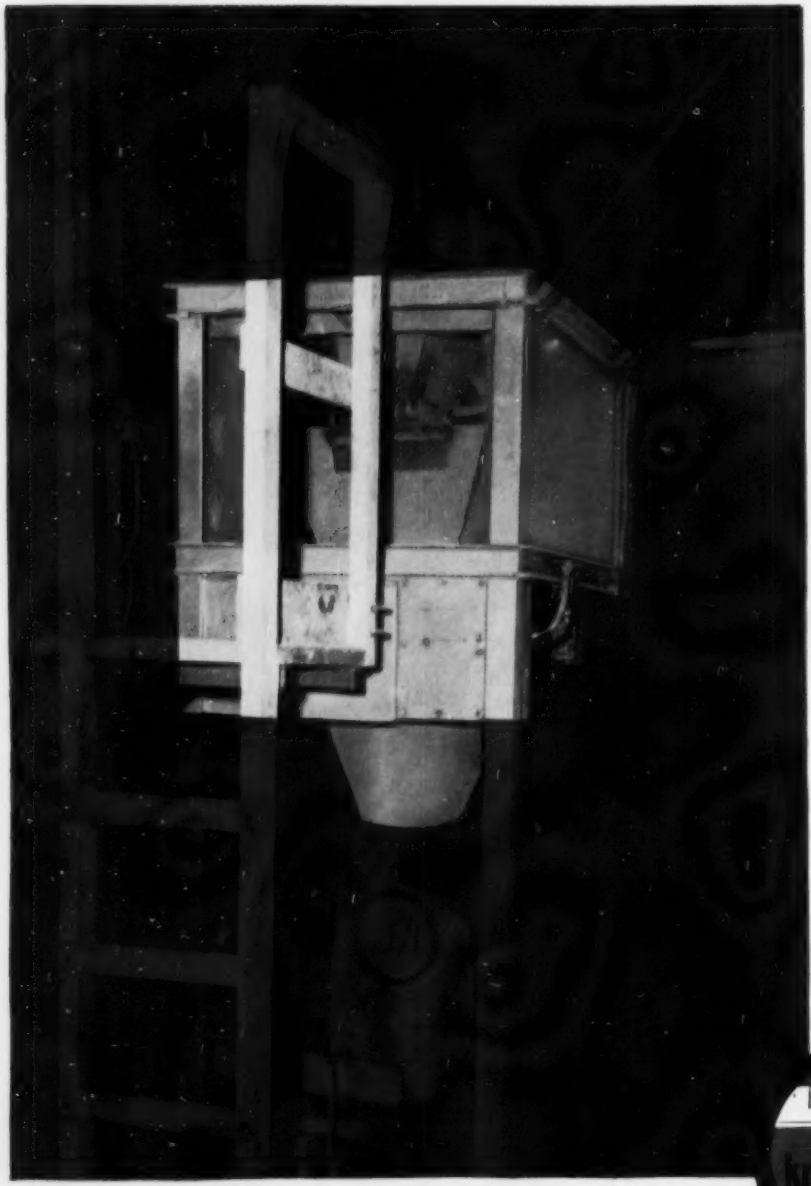
Virginia-Carolina Chemical Corporation

BAG DIVISION: 9th and Perry Streets, Richmond 5, Virginia

DISTRICT SALES OFFICES: Atlanta, Ga. • Wilmington, N. C. • New York, N. Y. • E. St. Louis, Ill. • Cincinnati, Ohio

Kraft Bag's NEW Packer

delivers greater accuracy and higher production at lower cost!



Kraft Bag Corporation the most completely integrated manufacturer of multiwall bags in the industry, is now marketing The **Kraftpacker,** an automatic open mouth bag filling machine that increases production and reduces packaging costs at an almost unbelievable rate.

The **Kraftpacker** maintains accuracy to within a few ounces, plus or minus, even at speeds up to 24-100 lb. bags a minute—*with one operator!*

Costing little money to buy, requiring little maintenance for steady operation, the **Kraftpacker** is a proved money-saver in every way... affording still greater economies for those who convert from valve bags.

There's a machine in operation near you. We shall be glad to arrange for you to see it.

You can depend on KRAFT both as a source of supply and as a source of complete satisfaction.

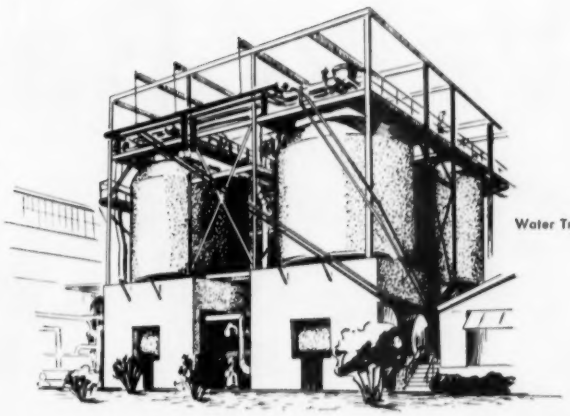
Sold exclusively by

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

Send for Brochure

630 Fifth Ave., New York 20, N. Y. Western Sales Office: Daily News Bldg., Chicago 6, Ill.



Water Treating Plant

Crude Sulphur

for Industrial Use

from the properties of

Texas Gulf Sulphur Co.

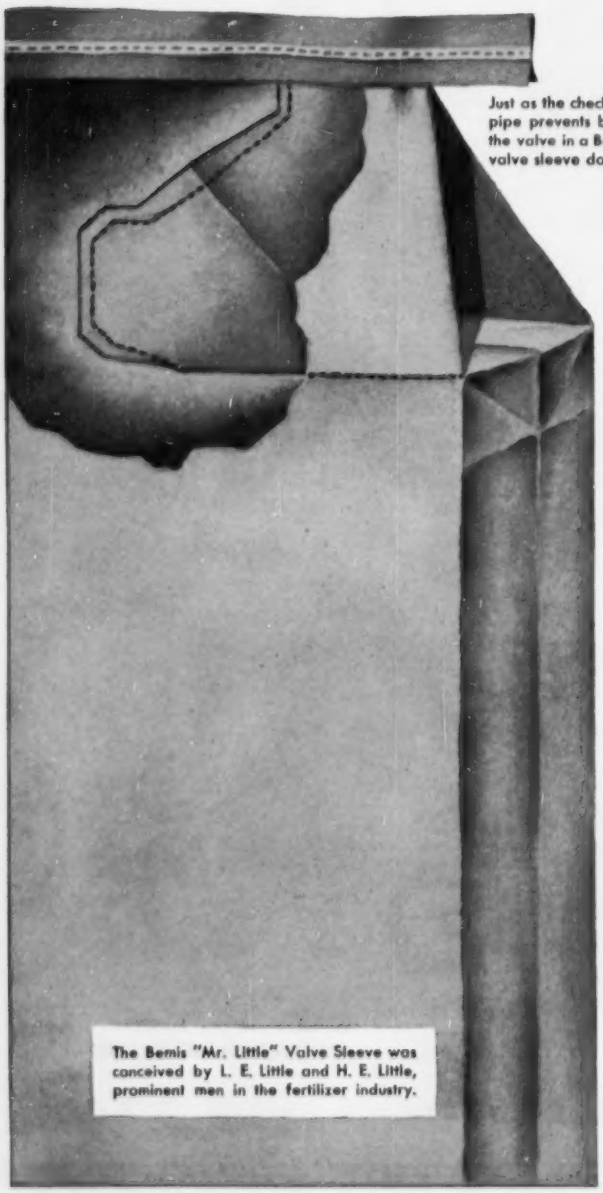
75 East 45th Street • New York 17, N. Y.

Producing Units

- **NEWGULF, TEXAS**
- **MOSS BLUFF, TEXAS**
- **SPINDLETOP, TEXAS**
- **WORLAND, WYOMING**

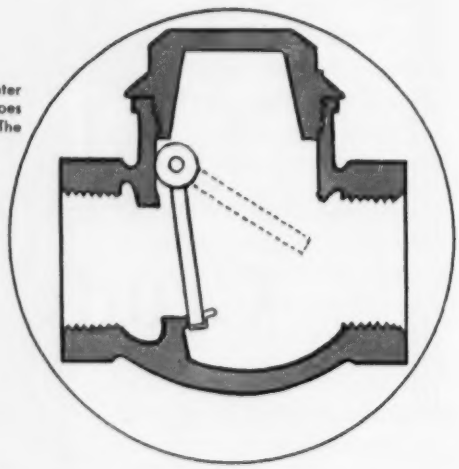
The most revolutionary Multiwall Bag development in years!

the NEW Bemis "Mr. Little" Valve Bag*



The Bemis "Mr. Little" Valve Sleeve was conceived by L. E. Little and H. E. Little, prominent men in the fertilizer industry.

Just as the check valve in a water pipe prevents back flow, so does the valve in a Bemis Multiwall. The valve sleeve does the trick.



Maximum Sifting Protection—Creases in the valve sleeve—a new principle—give a faster-acting, tighter closure particularly with troublesome granular or pelletized products. It *really seals in* the bag contents.

Valve Corner Moisture Protection—Since bag contents do not get into the valve pocket, "wick" action that draws moisture into the bag is avoided.

Cleaner Packing—Handling—Shipping—No more spilled fertilizer on packing room floors and conveyors; no more dirty cars received by your customers.

Ask your Bemis Man for the *complete* details. He'll gladly show and demonstrate the revolutionary new "Mr. Little" Valve Bag. Write or call him today.

Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

*Pat. Applied for

A completely new and different

PAYLOADER®

TRACTOR SHOVEL

Powerful break-out digging action

Fast, efficient bucket-loading action of the new Model HA "PAYLOADER" begins when the machine moves forward and forces the 18 cu. ft. bucket into the pile with up to 3,100 pounds of push.

Twin, double-acting hydraulic rams, independent of the boom elevators, next rotate the bucket on its hinges . . . the cutting edge slices up through the pile in a powerful "break-out" digging action.

Bucket roll-back of 40° is now completed. The loaded bucket is close to the machine and low — only six inches off the ground—in a stable, sure position for safe, rapid transport at speeds up to 10 mph.

Your Hough Distributor is ready to demonstrate this completely new and different Model HA and what it can do.

THE FRANK G. HOUGH CO.

[illegible]

Send complete information on the 1955 Model HA "PAYLOADER"

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

SAY "HUFF"

PAYLOADER®

MANUFACTURED BY

THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.

SUBSIDIARY INTERNATIONAL HARVESTER COMPANY

PAY DIRT

for pottery or pumpkins

In 1862, when John W. Searles, a prospector, staked mining claims on Searles Lake in California's Mojave Desert, he little knew he had discovered the richest natural deposit of *diversified* chemicals the world has ever known. In ensuing years triumphs in chemical engineering have enabled American Potash and Chemical Corporation to win from this vast dry lake bed millions of tons of basic chemicals vital to twentieth century life... POTASH, one of the three plant foods necessary to maintain our agricultural economy, BORAX, BORIC ACID, SODA ASH, SALT CAKE, BROMINE and LITHIUM CARBONATE used in the manufacture of glassware, ceramics, paper, enamelware and a countless array of consumer products. Constant improvement of the company's manufacturing processes at Trona, coupled with enlarged and modern research and development facilities, guarantee you a uniform and high quality source of supply.

American Potash & Chemical Corporation

TRONA
INDUSTRIAL AND AGRICULTURAL CHEMICALS

ESTON CHEMICALS

Offices
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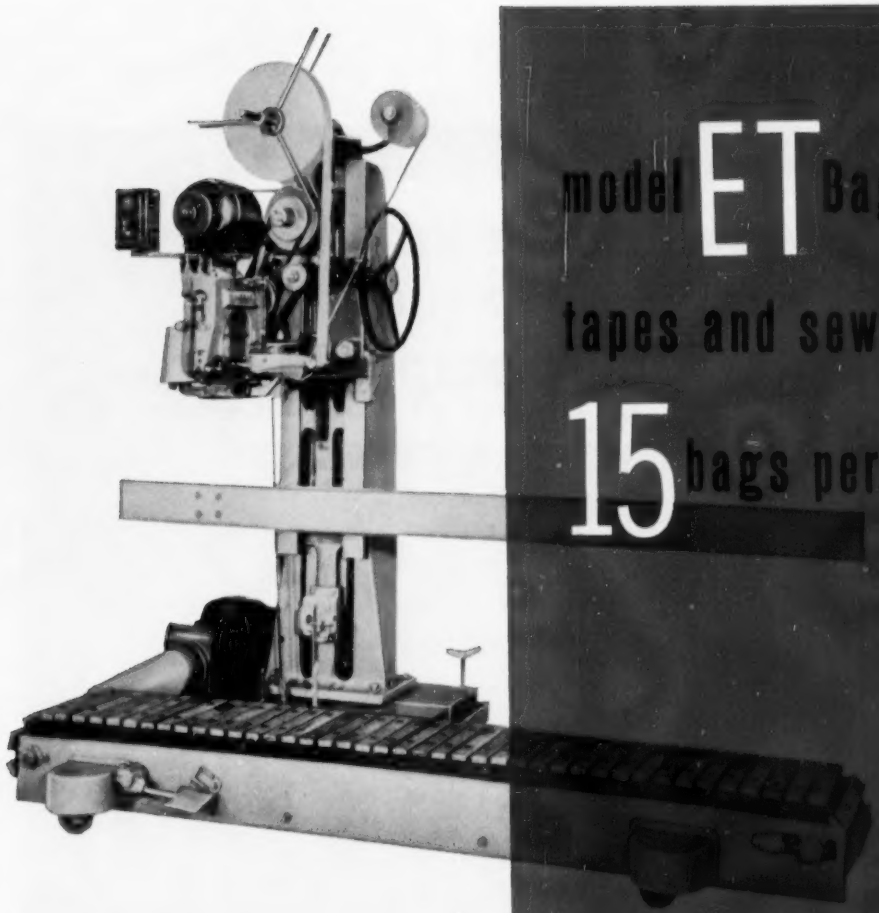
- 99 Park Avenue, New York 16, New York
- 214 Walton Building, Atlanta 3, Georgia

Plants
- Trona and Los Angeles, California

• BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM & BROMINE CHEMICALS
and a diversified line of specialized AGRICULTURAL, REFRIGERANT and INDUSTRIAL CHEMICALS



model ET Bagpaker®

tapes and sews

15 bags per minute

TAKE ADVANTAGE OF THESE 5 MODEL ET BAGPAKER FEATURES:

- One operator finishes 15 bags a minute when filled bags are delivered continuously to the conveyor
- Adjusts to bags from 25 to 100 lb. capacity
- Caster-mounted, the Model ET is easily moved to widely separated packaging stations
- Bag starts and stops sewing head when equipped with automatic sewing head control
- Automatic brake on Hoepner No. 150 Heavy Duty sewing unit prevents "coasting"

Here's the perfect teammate for your present filling and weighing equipment—the most efficient way to get better protection and faster packaging at the lowest possible cost.

Here's how the Model ET Bagpaker works: One operator receives bags from your weighing and filling machine. In four seconds or less the Bagpaker has applied creped "kraft" sealing tape over the bag end, sewn a reinforced "cushion stitch" through both tape and bag, and trimmed the tape. You can't beat that for efficiency and speed.

Booklet ET gives you complete details and dimensional drawings, shows you how perfectly Model ET fits into your existing filling set-up. There's no obligation—just write to: C-16

International Paper Company, Bagpak Division
220 E. 42 Street, New York 17

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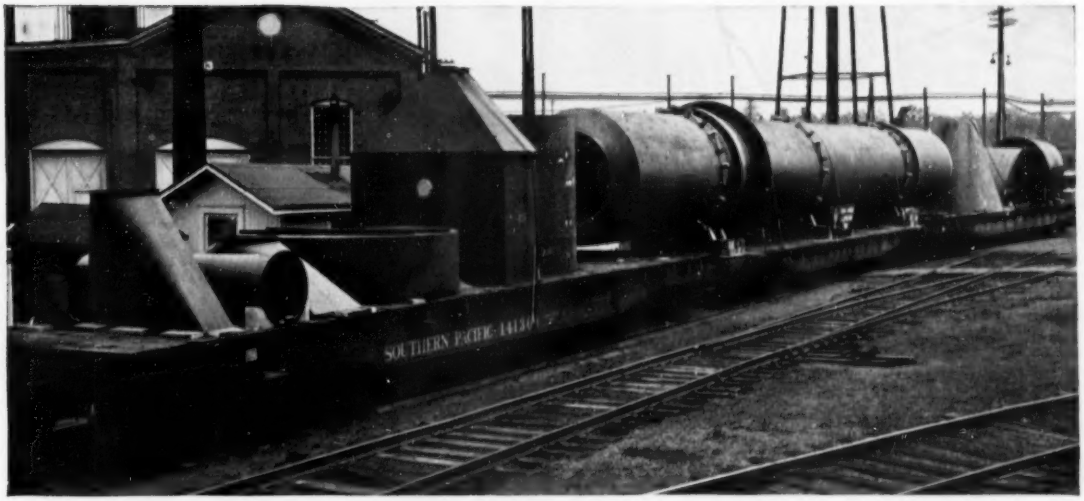

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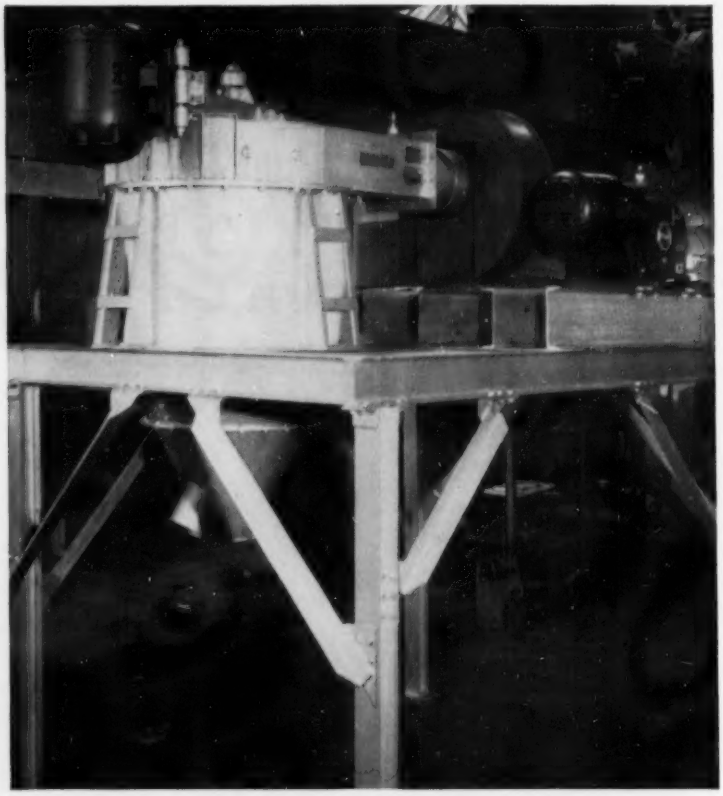

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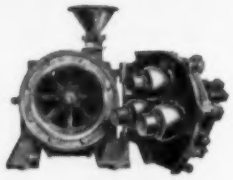

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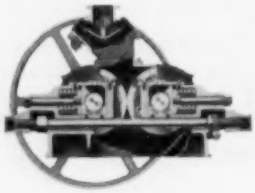

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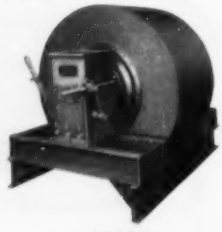

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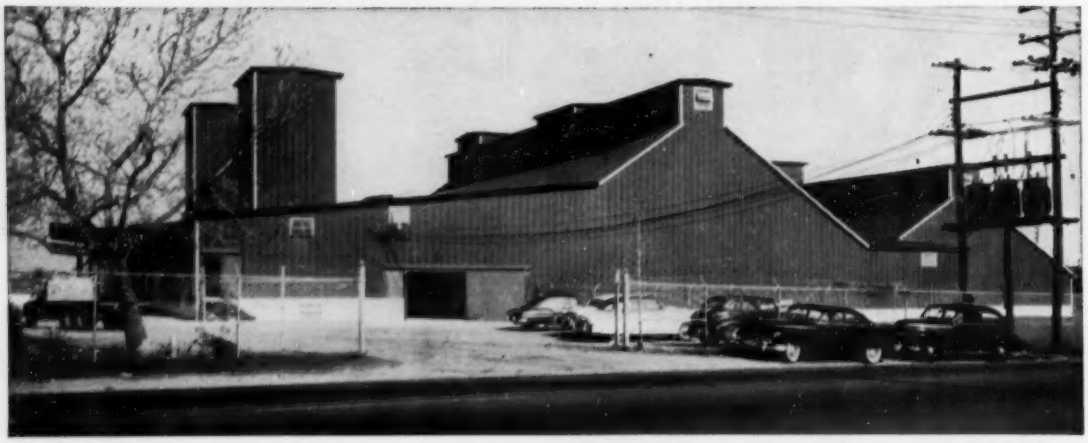

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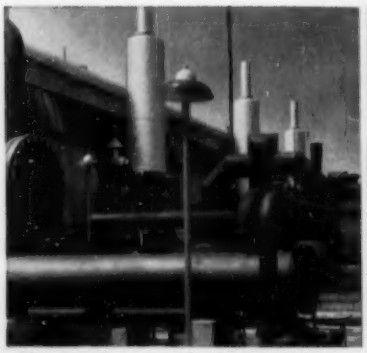

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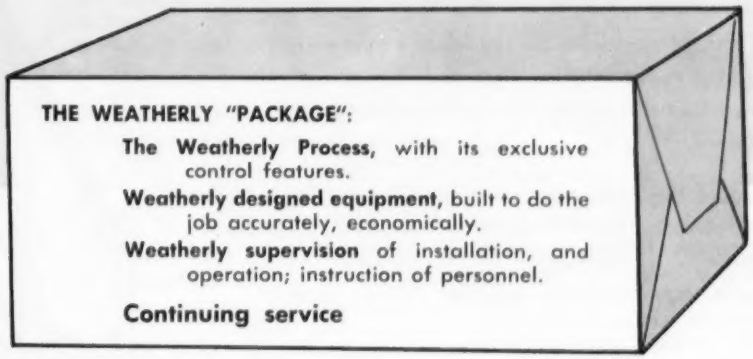
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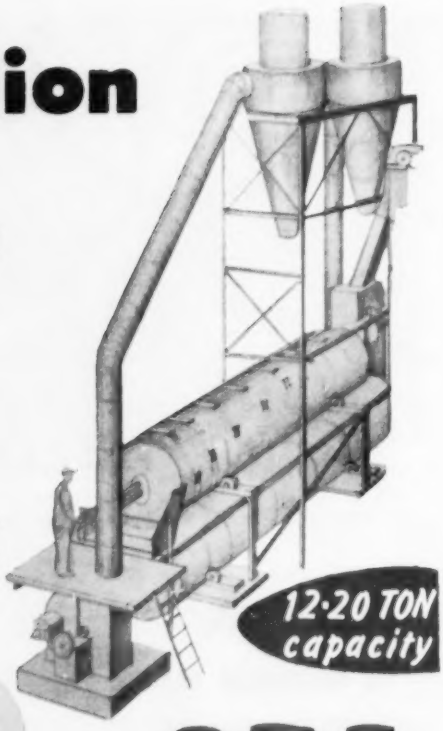

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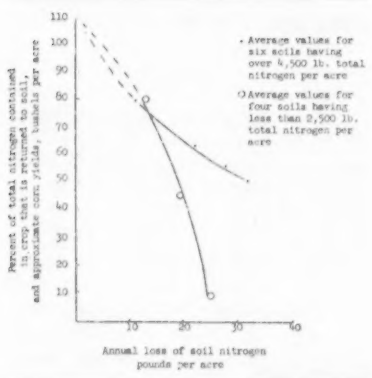

Figure 1.—Relation of Nitrogen Added to Soil in Terms of Crop Removals to Nitrogen Losses From Soils and to Corn Yields.

The problem of organic matter management is essentially a problem of the proper use of nitrogen and crop residue. Soil organic matter is usually considered as the residual product of decomposable residues and microbial tissues. By analysis this residual product usually contains a carbon : nitrogen ratio of approximately ten. Under most agronomic practices the limiting element in soil organic matter formation is nitrogen.

Numerous studies, such as those of Shutt (15), Snyder (17), Bracken and Greaves (5), Harper (8), Salter and Green (14), Myers (12), Moser (11), and Lee and Bray (10), have shown that soils decrease in total nitrogen, and hence in soil organic matter, with cultivation. A careful analysis of such studies shows that the nitrogen balance of the farming program has been negative; that is, crops have removed much more nitrogen from the soils than was being returned by legumes, manures, commercial fertilizers, rain water, or nonsymbiotic fixation. Since it is generally agreed that in an untreated soil the major source of nitrogen for crops is the soil organic matter, it follows that a depletive nitrogen cropping system must result in a loss of organic matter from the soil.

During the last 50 years many experiments have shown that crop yields could be increased by applying manures, legumes, and commercial nitrogen to soils that were low in nitrogen. The work of Smith (16), Hale (6), Andharia et al (1) Krantz (9), Blair and Prince (3), Reynolds and Norris (13), and others could be cited to illustrate the increases in crop yields obtainable from various nitrogen sources. **In general the kind of nitrogen carrier that is used is less important than the total amount of nitrogen the carrier adds.** When nitrogen is added to a soil, whether in the form of legumes, manures, or commercial fertilizers, in an amount adequate to meet the nitrogen needs of a crop, the yields of that crop will be similar regardless of carrier.

While there have been many studies of the effects of cropping systems on the yields of crops and loss of soil organic matter, very few have been reported in which soil organic matter maintenance or build-up has been achieved. Using the land for permanent pastures or keeping it in sod several years has been about the only agronomic practice that has been successful in building up the organic matter supply in a soil. Some studies of the effect of agronomic practices on soil organic matter have been made at Illinois under field conditions. The purpose of this paper is to report some of these studies.

The Morrow Plots at the University of Illinois were established in 1876 for the purpose of studying cropping systems and soil treatment practices. Rather complete records have been kept of these studies. Soil samples collected from these plots at 10-year intervals since 1904 are still available for analyses. They have been analyzed for total nitrogen and carbon, and the data are given in Table 1. The rotations are as follows: Plots 3-N and 3-S have

Paper presented at the Soil Microbiology Conference, Purdue University.

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been in continuous corn, plot 4-N in a corn-oats rotation, plot 4-S in a corn-oats (legume catch crop) rotation, and plots 5-N and 5-S in a corn-oats-legume rotation. The zero, or no treatment, plots have had all crop residues (grain, stover, straw, and legume) removed, while the M, or manure, plots have received a quantity of manure equal in weight to the crop growth removed. All S plots have also received lime and phosphorus treatments. Obviously the zero plots have all lost more soil nitrogen during the 40-year period than the manure-treated plots.

However, it is of interest to note that the zero plots under continuous corn have lost only a little more nitrogen through cropping than the plots with the corn-oats or corn-oats-legume rotations. Rotating crops, then, does not effectively conserve soil nitrogen, or soil organic matter, so long as the various crops that are grown are capable of using more nitrogen than the organic matter in the soil can release. Where manure has been added and supplemented with a legume, the soil losses have been very small for nitrogen, and the carbon has actually increased. Even on the continuous-corn plots with treatment, there have been very small changes in nitrogen and none in carbon content of the soil. The decrease in soil nitrogen is therefore primarily a result of the treatments rather than of the crop rotations or cultivation.

An attempt has been made to analyze the nitrogen balance on the Morrow Plots, and these data are presented in Table 2. But the data must be viewed with some reservation, because detailed plant analyses are not available for the entire period. The nitrogen composition of the crops has been determined fairly regularly only since 1936. Therefore, in determining the amount of nitrogen removed by crops, the average of the analyses determined since 1936 was assumed to represent the average composition for the period. Similarly, manure analyses are not available, and therefore a standard composition of 10 pounds of nitrogen per ton of manure has been used. For these reasons the data are more indicative of trends than of finite values.

Table 2 shows that more nitrogen has been released from the soil under the continuous-corn system than can be accounted for by crop removals. Adding oats to the corn (corn-oats rotation) resulted in a saving of some of this nitrogen in the form of crop growth. Adding the legume catch crop to the corn-oats

Table 1.—Nitrogen and Carbon Content of the Morrow Plot Soils at Different Dates of Sampling

		1904		1913		1923		1933		1943		
Plot	Treatment	Nitrogen lb. /A.	Carbon lb. /A.	Nitrogen lb. /A.	Carbon lb. /A.	Nitrogen lb. /A.	Carbon lb. /A.	Nitrogen lb. /A.	Carbon lb. /A.	Nitrogen lb. /A.	Carbon lb. /A.	Corn Yields [1] bu. /A.
3-N	O [2]	3,600	45,000	3,400	43,000	3,000	39,000	2,900	36,000	2,600	33,000	25
3-S	MLP [3]	3,800	44,000	3,900	50,000	3,600	46,000	3,500	45,000	3,200	44,000	49
4-N	O	4,100	50,000	3,900	46,000	3,500	44,000	3,300	43,000	3,200	43,000	34
4-S	MLP	4,000	52,000	4,200	53,000	4,100	53,000	4,000	54,000	3,900	53,000	62
5-N	O	4,500	57,000	4,300	53,000	4,100	52,000	3,800	49,000	3,700	49,000	53
5-S	MLP	4,700	59,000	4,700	58,000	4,600	56,000	4,500	59,000	4,600	62,000	74

[1] Yield average for corn for years when all plots produced corn.
[2] No fertilizers, all residues removed.
[3] Limed, phosphated, and manured, with manure added equal to weight of crops removed.

Table 2.—Approximate Nitrogen Balance Sheet for the Morrow Plots, 1904 to 1943

Plot	Rotation	Treatment	Nitrogen contained in crops lb. /A.	Nitrogen added to Soil [1] lb. /A.	Nitrogen in crop less that added lb. /A.	Nitrogen soil losses lb. /A.	Nitrogen balance lb. /A.	Nitrogen gain for rotation lb. /A.
3-N	Continuous corn	O [2]	850	320	530	940	—410	
3-S	Continuous corn	MLP [3]	1,800	1,360	440	630	—190	
4-N	Corn-oats	O	1,100	320	780	890	—110	300
4-S	Corn-oats (legume catch)	MLP	2,380	1,460	920	120	+800	990
5-N	Corn-oats-legume	O	1,230	320	910	810	+100	510
5-S	Corn-oats-legume	MLP	1,930	1,280	330	160	+170	360

[1] Nitrogen contained in manure plus that added by rain water.
[2] No fertilizers, all residues removed.
[3] Limed, phosphated, and manured, with manure added equal to weight of crops removed.

Table 3.—Soil Nitrogen Changes and Yields and Responses of Corn to Added Nitrogen on Some Illinois Experimental Fields

		Not treatments				Lime-residues-phosphates-potash			
Field	Rotation [2]	N-level 1945 lb. /A.	N-lost 1935-1945 lb. /A.	Yield corn 1943-1946 bu. /A.	Yield corn with added nitrogen [1] 1943-1950 bu. /A.	N level 1945 lb. /A.	N lost 1935-1945 lb. /A.	Yield corn 1943-1946 bu. /A.	Yield corn with added nitrogen [1] 1943-1950 bu. /A.
Kewanee	C-C-O(leg)-W(leg)	4,520	360	46	58	5,280	400	65	87
Hartsburg	C-C-O(leg)-W(leg)	4,480	380	57	71	5,100	220	77	82
Aledo	C-C-O(leg)-W(leg)	4,040	220	53	72	4,300	120	82	88
Joliet	C-C-Sb-O(leg)-W-L	4,260	280	39	40	5,600	260	77	84
Dixon	C-C-L-W(leg)	3,280	400	47	62	3,940	220	88	99
Oblong	C-Sb-W(leg)-Timothy	2,300	240	20	28	2,560	180	69	93
Raleigh	C-O-L-W(leg)	2,300	200	21	21	2,520	180	58	59

[1] Nitrogen additions varied from 60 to 100 pounds N per acre per rotation.
[2] C=corn, O=oats, (leg)=legume catch, Sb=soybeans, W=Wheat, and L=legume standover.

rotation resulted in a big gain, 990 pounds, in nitrogen economy. With the residues handled as they are on the Morrow Plots, the corn-oats-legume rotation appears to be at a disadvantage compared with the corn-oats (legume catch) rotation, largely because the standover legume is cut for hay and an equivalent weight of manure is returned that is much lower in nitrogen. However, the results emphasize the value of a legume catch crop in a small grain for grain systems of farming. They also show that there is little or no relation between yields and the amount of organic matter the soil contains when the land is treated.

Table 3 shows the effects of crop rotations on yields of corn and on soil organic matter losses on several Illinois experimental fields. The level of soil nitrogen found in 1945 on the treated and untreated plots, as well as the loss in nitrogen that has occurred in the soil during the last 10 years, is given. Generally more nitrogen is lost from the untreated plots than from the treated plots where legumes have been included in the rotations. The main point of interest is that most of the nitrogen that was added to the rotation by the legume crops has gone to produce increased crop yields instead of to conserve soil organic matter.

This result was to be expected because the amount of nitrogen the crops could have used far exceeded that furnished by the legume. As long as crop yields are limited by nitrogen fertility, rather than by season or stand, as is indicated by the responses of corn to added nitrogen, the crops will continue to take up all of the nitrogen released from decomposing organic matter. Under such conditions the benefits from the use of limited amounts of legume, manure, or commercial nitrogen fertilizer will be largely in the form of increased yields of the cash crop rather than in conservation of soil organic matter. **Until the nitrogen treatments reach full maintenance levels, it cannot be expected that soil organic matter will be maintained.**

The nitrogen treatments indicated in Table 3 were started in 1943 and range from 60 to 100 pounds of nitrogen per acre per rotation. No data are available on these plots to determine the effect of this nitrogen treatment on the loss of soil organic matter. It is expected, however, that the added nitrogen will reduce the rate at which soil organic matter is being lost from these soils. These data will be obtained when the next regular 10-year soil samplings are made in 1955.

Table 4.—Effect of Nitrogen and Legumes on Soil Nitrogen, Dixon Field

Rotations and treatments	Nitrogen in soil, 1946 lb. /A.	Nitrogen difference in soil for treatment lb. /A.	Yields of corn bu. /A.	Time interval for experiment and yield, average years
Continuous corn	4,130		66	1932-1946
Continuous corn + nitrogen [1]	4,240	110	70	1932-1946
Corn-oats	2,950		55	1940-1946
Corn-soybeans (beans harvested for seed)	3,290	340	66	1940-1946
Corn-soybeans (beans plowed under green)	3,459	500	88	1940-1946
Corn-oats-wheat	3,560		58	1927-1946
Corn-oats(leg)-wheat(leg)	3,720	160	77	1927-1946
Corn-oats-legume-wheat, residues removed	3,880		50	1910-1946
Corn-oats-legume-wheat(leg), full treatment	4,240	360	75	1910-1946
Corn-oats-legume-wheat(leg), manure system [2]	4,420	540	77	1910-1946

[1] Nitrogen treatment 66 lb. /A. 20-0-0 annually, 1932 to 1939; 264 lb. /A. 16-0-0 annually, 1940 to 1946.
[2] Manure added equivalent to weight of crops produced along with lime and phosphate treatments.

At the Dixon field several rotation experiments are being conducted which may be compared in a relative way to show how using increased amounts of nitrogen in a rotation tends to decrease the rate at which nitrogen, and hence soil organic matter, is being lost from the soil. Again the data emphasize the fact that it is a shortage of nitrogen rather than crop residues that retards the formation of soil organic matter. These data, presented in Table 4, must also be viewed with some reservation, because original soil samples taken at the start of the experiments are not available.

One must assume, therefore, that within each comparison the plots were similar in nitrogen and organic matter content at the start of the experiments. In general, such an assumption is valid for relative comparisons, but the actual pounds-per-acre values given in Table 4 cannot be taken as rigid evaluations of the systems. The significant information presented here is that the use of nitrogen, legumes, and manure, when accompanied by the normal crop residues that are produced, retards the rate at which nitrogen is being lost from these soils.

The greater the amount of nitrogen, or legume, used in the rotation, the greater has been the difference between the untreated and treated plots. Since in all cases less nitrogen has been supplied than crops have removed, probably all of the treatments and rotations are decreasing the amount of nitrogen in the soil. A possible exception may be the corn-soybean rotation, in which the soybeans are plowed under green as a green manure crop and no grain crop is harvested. But soil organic matter is decreasing at a slower rate on the nitrogen-treated plots than on the untreated plots.

Several investigations, including those of Broadbent (4), Bingeman et al (2), and Hallam and Bartholomew (7), have indicated that adding relatively small amounts of either crop residues or nitrogen to soils tends to increase the rate of decomposition of the native soil organic matter. Only when relatively large amounts of residues and nitrogen were added did soil organic matter appear to accumulate. Most of these studies have been conducted under laboratory conditions with soils that were well aerated and incubated at temperatures somewhat higher than those encountered under field conditions.

The inference might be made, therefore, that carbon could be expected to accumulate in soils under field conditions at lower levels of residue and nitrogen applications. Under field conditions soil organic matter does actually accumulate under proper management conditions. The fact that soil organic matter does built up in soils under permanent sod or long-time pastures is well known; however, actual build-up or maintenance under intensive cultivation is more difficult to achieve.

In 1947 an experiment was set up at Illinois to determine whether soil organic matter could be built up or maintained while the soil was under an intensive cultivation program. The plots that were used, referred to here as the Burwash Plots, were fully fertilized with all major and minor elements, and then straw and nitrogen at various rates were added. These nitrogen treatments were over and above the nitrogen additions made to equal crop removals. Continuous corn was grown on the plots. Cultivation was heavy in order to make conditions as unfavorable as possible for formation of organic matter. Soil samples were taken from all plots at the start of

Table 5.—Effect of Straw and Nitrogen Additions on the Carbon and Nitrogen Content and Corn Yields of a Flanagan Silt Loam Soil, Plow Depth (tentative data)

Straw added yearly for 4 years	Nitrogen added [1] yearly for 4 years	Gain or loss treatments in 0-6 inch depth		Corn yields 1948-1950
		Carbon	Nitrogen	
tons/A.	lb./A.	lb./A.	lb./A.	bu./A.
0	0	−2,000	0	92
0	62	−1,500	50	102
0	125	−1,500	250	106
0	250	−2,500	150	115
2.5	34	−1,000	− 50	102
2.5	62	−1,500	300	105
2.5	125	−2,000	250	111
2.5	250	−2,000	100	113
5.0	68	− 500	200	101
5.0	125	− 500	300	108
5.0	250	− 500	300	114
5.0	500	500	250	118
10	135	2,500	50	103
10	250	6,000	250	109
10	500	6,500	600	111
10	1,000	6,500	350	118
20	270	7,000	350	95
20	500	7,500	600	102
20	1,000	7,000	550	101
20	2,000	8,500	600	66
2.5 Legume	125	−1,000	250	111
2.5 Legume	250	−1,500	350	113
Rotations [2]				
C-C - Cultivated	250	1,000	150	96
C-C - Uncultivated	250	3,000	300	96
C-C - Rye Cover	200	4,000	200	89
C-C - Cultivated	0	−1,000	−100	44
C-O(leg)	250	2,000	300	105
C-O(leg)	0	− 500	0	90
Standard deviations		C=1,500 lb./A.		N=100 lb./A

[1] These nitrogen treatments are in addition to full maintenance.
[2] These treatments include nitrogen added for maintenance except where no nitrogen was used.

the experiment and again at the end.

This procedure made it possible to compare the changes that occurred within each plot, without having to refer to a check plot. All of the aboveground portions of the corn crop were removed, and the plots were left exposed during the winter. The straw, legume, and nitrogen were applied and plowed under in the spring. These applications were made for four successive years, and the materials were allowed to decompose for another year before the final soil samples were taken. On the same field other studies were made of several cultural practices, such as continuous corn with and without cultivation, sod cover crops, and corn-oat (legume catch) rotations in which normal residues were returned with and without added nitrogen. The data, which are given in Table 5 and are preliminary in nature, show the changes in the surface plow depth.

Nitrogen alone was not able to maintain the level of soil carbon when no residues were applied, but the levels of soil nitrogen apparently were maintained. Under this intensive cultivation, five tons of straw had to be added per year in order to maintain the carbon levels in the surface plow layer. As indicated in Table 5, soil organic matter can be maintained or even built up under intensive cropping systems, provided sufficient or even built up under intensive cropping systems, provided sufficient quantities of carbonaceous materials and nitrogen are added to the soil.

These data must be considered tentative because the method of determining carbon as organic matter left some question as to its accuracy. That is, when do added carbonaceous materials become sufficiently decomposed to be considered soil organic matter? The criterion used here was a flotation process. The soil samples were subjected to a flotation process that allowed all undecomposed straw or residues to be floated off the sample. It was assumed that any straw or crop residues that could be floated off the sample had not decomposed to any material degree. Use of a very dilute acid in the flotation process also made it possible to remove all nitrates and exchangeable ammonia from the sample. Under these conditions the nitrogen values should represent essentially the total organic nitrogen in the soil.

As the data indicated, whether legumes, or grain straw plus nitrogen, is added seems to make little difference, so far as organic matter formation is concerned, when a nitrogen maintenance fertilizer program is being followed. Usually the first increment of nitrogen, which represents one-fourth of the nitrogen needed to convert all of the carbon in the residues to carbon as soil organic matter (assuming no loss of carbon in decomposition), gave the biggest increases in amount of organic matter formed in the soil. This rate represents the equivalent of material containing about 1.25 percent of nitrogen.

Cultivating appeared to retard the formation of soil organic matter, while adding nitrogen in excess of that removed by crop increased the amount of both carbon and nitrogen in the soil. **Here again residues alone were not enough; nitrogen had to be added in order that organic matter be formed faster than it was destroyed.** Of particular interest is the indication that normal quantities of crop residues, obtainable under high fertility and a nitrogen-maintenance program, can probably maintain organic matter levels in soils that have lost considerable quantities of their native organic matter but that still have fairly good physical properties.

In the more practical aspects of soil organic matter management, a question arises as to whether it is either desirable or necessary to maintain soil organic matter. It is doubtful whether it is essential to build up organic matter in soils that still retain reasonably good physical properties. But the value of maintaining a supply of actively decomposing materials in a soil is generally recognized. In striving to produce the maximum crop yield that each season is capable of producing when no plant nutrients are deficient, cultural and fertilizer practices will of necessity be such that soil organic matter will be maintained if crop residues are returned to the soil and surface erosion is controlled.

The general relation between yields and soil organic matter conservation, as measured by nitrogen losses in the soil, has been demonstrated on a limited scale on several experimental fields in Illinois. This relation is shown graphically in Figure 1. The solid-line portion of the curves is based on data on nitrogen use, yields, and soil losses of nitrogen, while the broken-line portion represents nitrogen use and yield relationships only, since the experiments have not been going on long enough under full nitrogen

The Awards Committee of The American Forestry Association is now receiving nominations for the annual Conservation Awards. Members of the Committee (reading from left to right) are: Lowell Besley, Executive Director, AFA; Rep. Watkins M. Abbitt, (D-Va.); Dr. M. D. Mobley, Executive Secretary, American Vocational Association, Inc.; Robert N. Hoskins, Chairman, Industrial Forester, Seaboard Air Line Railroad; Bryce C. Browning, Secretary-Treasurer, Muskingum Watershed Conservancy District; Arthur R. Spillers, Chief, Division of Cooperative Forest Management, U. S. Forest Service; Louis H. Wilson, Secretary and Director of Information, American Plant Food Council.
The five awards presented by the Committee each year are given in the fields of public information, business and industry, public servants, education, and general service. Individuals, organizations, etc. are invited to submit nominations, which must be received by June 15, 1955, at AFA headquarters, 919 Seventeenth Street, Northwest, Washington 6, D. C.
The awards presentations will be made at Jacksonville, Florida, October 5, in conjunction with the 1955 Annual Meeting of the Association in that city.

maintenance to measure the soil changes. The data seem to indicate, however, that, as yields are increased to their maximum by increasing use of nitrogen up to full maintenance, nitrogen losses from the soil can be reduced to zero.

Organic matter management in agronomic practices is largely a problem of proper handling of residues and nitrogen fertilization. No system of management or crop rotation can be expected to maintain or build up soil organic matter if the amount of nitrogen removed in harvested crops and other soil losses exceeds the amount being returned to the soil by legumes, manures, and commercial fertilizers. **Nor will nitrogen alone maintain soil organic matter; it must be accompanied by crop residues.** Low nitrogen residues, such as corn stover or grain straw, accompanied by commercial nitrogen can supply a source of actively decomposable materials in the soil that will tend to promote good soil physical properties. Such conditions can be achieved for most soils if the nitrogen program is adequate to meet the yield potential of the average season and if the normal crop residues are returned to the soil. When the large quantities of straws and stovers produced by maximum yields are returned to the soil, they will be more than sufficient to maintain soil organic matter levels, provided the nitrogen supplies are equal to, or greater than, maintenance requirements. Nitrogen fertilization and cultural practices are therefore keys to soil organic matter maintenance.

The good farmer is the one who obtains the maximum crop yields possible from the soil and the season. To do so, he must supply sufficient plant nutrients, including nitrogen, to place no limits on yields except those imposed by weather and plant population—not by soil fertility. **To assure himself of such conditions, he must usually add more fertilizers than the harvested crops are removing.** If he does supply the fertility his soil needs for maximum yields, and if he does return the normal crop residues, then, in genearal, his problem of maintaining soil organic matter will be largely solved.

Many investigations have been conducted to measure the rate at which soil organic matter releases soil nitrogen to growing crops. While such studies have some theoretical interest, the practical implications of such work are limited to systems of farming that are designed to destroy soil organic matter. Once a program of maintaining organic matter. is started, nitrogen must be returned in some form, such as legumes, manures, commercial nitrogen fertilizers, or combinations of them, and in amounts equivalent to crop removals and other soil losses. Since microbial activity in a soil is limited essentially to the growing season, it matters little how much nitrogen is released from the soil organic matter, for a similar amount must be supplied to become "fixed" as new organic matter if the soil levels are to be retained. This means, then, that essentially all of the nitrogen removed by the harvested crop must be supplied by some form of nitrogen fertilizer.

FARMER INCOME HOLDS FIRM MORSE TELLS FARM JOURNAL

Although total farm income has dropped in the past five years, income of individual farmers has remained stable, Farm Journal magazine reports in its March issue. The reason? The farm population also has been dropping, and fewer families are dividing up the farm dollar.

True D. Morse, under-secretary of agriculture, in an exclusive interview, told the magazine, "Yes, we've had a dip . . . but sometimes national figures are used to cause undue alarm. Farm prices tell only part of the story.

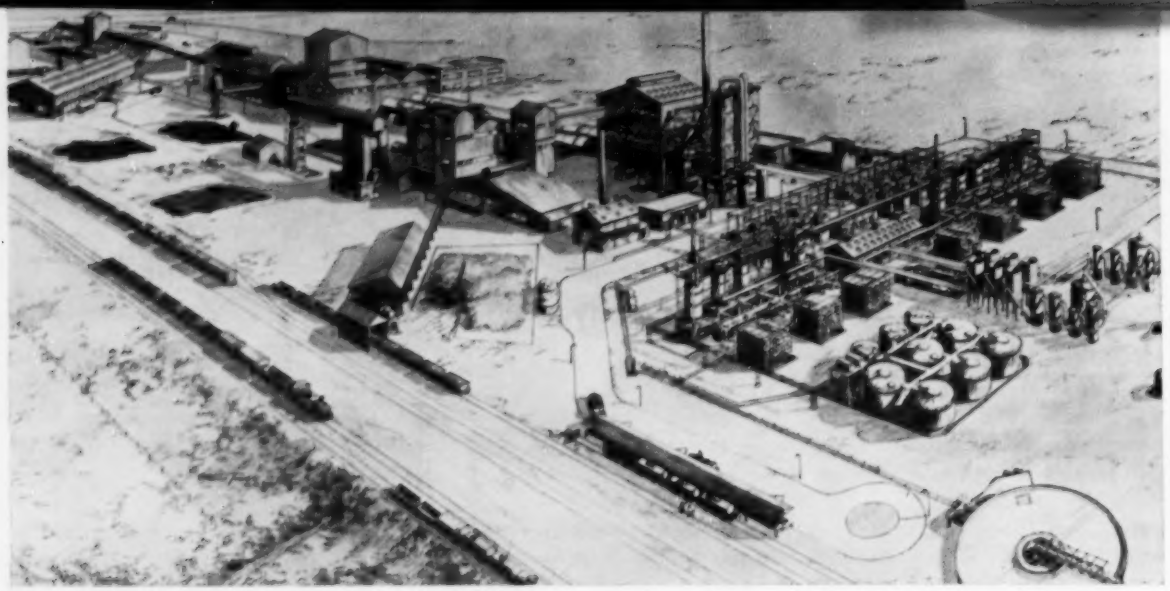
"Actually, after we—the nation's farmers—paid our costs in 1954 we had more money left than in 1950.

"The income per farm person, from farm goods, was 11% higher. When you add the money farm people made off-the-farm, the increase per person is 18%.

"Our realized farm income declined 25% between 1947 and 1954 . . . but know what actually happened? There were 20% fewer of us living on farms in 1954. So our farm income **per person** dropped only 5%. Throw in what we made off-the-farm, and the income per farm person actually **increased** 6%."

Farmers' financial reserves, in the form of bank deposits, cash, savings bonds, and investment in co-operatives rose in 1954, while the farm debt remained constant at $17 billion—the same as a year earlier, Morse pointed out.

Turning to the future, the under-secretary told Farm Journal that he sees a bright picture ahead. "The rapid upsurge in population," he said, "is adding to farmers' markets at an amazing rate. This growth alone takes nearly two billion more pounds of milk each year . . . People are eating more beef than ever before. Government stocks of butter have decreased from 466 million pounds last July to 260 million pounds today. Sheep will become more profitable with the wool incentive payments. Egg prices are becoming profitable again. Broiler prices have gone up about a third in recent weeks."



NEW BRITISH

ANHYDRITE SULPHURIC

ACID PLANT

Capable, when completed, of producing about 148,000 tons of sulphuric acid per annum, of which the fertilizer industry will take a substantial share, a new anhydrite sulphuric acid plant is in the final stages of construction at Widnes, Lancashire, for the recently formed United Sulphuric Acid Corporation Limited (USAC.) The first unit of the factory is due to be put into commission in April 1955.

When, at the time of the sulphur crises in 1951, the chemical industry became seriously concerned the Imperial Chemical Industries Limited offered to license their knowledge and experience of the anhydrite process of making sulphuric acid to the large British industrial users of sulphuric acid and eleven of these formed the United Sulphuric Acid Corporation Limited under the chairmanship of Mr. F. G. C. Fison, of Fisons Ltd. I.C.I. agreed to act as technical advisers to USAC for the construction of a new factory at Widnes to produce sulphuric acid and cement clinker from anhydrite and other indigenous raw materials

Calcium sulphate in the form of anhydrite is the only suitable sulphur-bearing material available in large quantities in Britain for the manufacture of sulphuric acid. Of this material immense underground deposits are known to exist. As well as yielding sulphuric acid the anhydrite as processed also yields roughly equal quantities of cement clinker.

Early development of this process was slow and costly. Two experimental kilns were built in Germany during the first world war, but operating difficulties persisted until the 1930s. After research in Britain I.C.I. started a kiln at Billingham in 1930 and, having overcome some initial troubles, put a second kiln in commission in 1935. These have run ever since and now produce annually about 100,000 tons of sulphuric acid and a similar quantity of clinker, which is made into Portland cement.

Anhydrite, the principal raw material for the Widnes factory, of which about 240,000 tons will be used annually, will be supplied by The British Plaster Board (Holdings) Ltd., from their Long Meg mine in Cumberland, which has been specially developed for this purpose. The other raw materials, coke, sand and shale and coal for kiln firing are available locally. As there is a large demand for cement in the Merseyside area, Associated Portland Cement Manufacturers Limited have agreed to buy the 132,000 tons or so of clinker produced annually by USAC to make Portland cement from it in a new cement works which they are building adjacent to the Widnes acid plant. The sulphuric acid itself, of which about 148,000 tons will be produced annually, will be bought in agreed quotas by the member firms of USAC for their own consumption. The plant's output of sulphuric acid will represent something like 7½ per cent of Britain's present total acid production and will thus make a substantial contribution to the national economy. By replacing the use of some 53,000 tons of imported sulphur it will also save the expenditure of about $2 million a year and assist, in the long run, in the world's supply of sulphuric acid.

Provision is made for a future 50 per cent increase in the capacity of the factory. The total cost of the present Widnes project is in the region of £5 million.

Being responsible as technical advisers to USAC, ICI have also provided a team of engineers and inspectors under a construction manager to supervise, on behalf of USAC, the construction of the factory by the contractors, Simon-Carves Limited, a lending firm of designers and builders of heavy chemical plant, with over 40 years' experience of sulphuric acid plant construction both in Britain and abroad. Their contract for the Widnes factory amounts to about £4 million and they have a license agreement with ICI under which they can build plants of this type in any part of the world.

Collaborating with Simon-Carves

Limited are Simon Handling Engineers Limited, specialists in large-scale industrial handling plants. Their share of the work amounts to a little over £1 million.

The sulphuric acid production process involves the handling and preparation of the raw materials, production of gas containing SO_2 with simultaneous production of cement clinker, purification of the gas produced, conversion of SO_2 to SO_3 to form sulphuric acid.

Delivered dry by rail in 25½-ton wagons the anhydrite is received by rail hopper and skip hoist and can either be conveyed to a 12,000-ton storage dump for subsequent reclaiming or can be conveyed direct to a pair of crushers and elevated thence to a storage bunker.

Sand, shale and coke are delivered from wet storage bunkers to two rotary dryers heated by combustion gases from oil burners. One dryer treats sand and shale, the other being reserved for coke only. The dried materials are taken to dry storage bunkers.

From the storage bunkers a pair of belt conveyors deliver correctly proportioned feed to two ball mills, where grinding and mixing takes place, the resulting "raw meal" being elevated and delivered by air-slide distributing conveyor to storage and blending silos. From these silos the raw meal passes through special feeding devices to the feed end of the kilns. Pulverised coal is fed to the firing end of the kilns.

Each 355 feet in length, the two rotary kilns are, in general, similar to orthodox cement kilns but the linings and certain other details are specially modified. The silica, alumina and iron oxide in the sand, shale and coke combine with the lime in the anhydrite to form cement clinker giving off gasses, which, leaving the two kilns, are kept in two separate streams. Hot and dust laden and containing mainly sulphur dioxide, oxygen and nitrogen, the two streams of gasses are cleaned, cooled and converted into sulphuric acid by what are, in effect, two similar plants in parallel.

The bulk of the duct is removed in a smoke box and cyclone. The gas then passes to a cooling tower over which clarified river water is pumped, cooling and saturating the gas and removing most of the remaining dust. Each stream of gas then passes through a set of four pairs of electro-precipitators, in which the last particles of mist and dust are removed. In order to allow any two precipitators to be taken out of service for cleaning or repair, an extra pair is provided, which can be used on either gas stream.

Operating on the orthodox contact system the two sulphuric acid plants are identical except that one of them incorporates an oleum tower.

Each gas stream passes through a drying tower, in which water is removed by counter-current circulation of strong sulphuric acid. The dried gas then passes through blowers into a multi-stage converter, in which, in the presence of vanadium catalyst, the sulphur dioxide and oxygen in the gas combine to form sulphur trioxide. As this process is productive of heat, heat exchangers are used between the stages of conversion in order to maintain the gas at a suitable temperature. The sulphur trioxide is then passed through cooling towers in series, the last of the towers being water cooled.

Each sulphur trioxide stream then passes through two absorber towers in which it is absorbed in strong sulphuric acid, part of the sulphur trioxide in one stream having been absorbed in an oleum tower. The strength of the acid leaving the absorbers is kept constant by dilution with water, and the net "make" of acid thus obtained is pumped to storage. From the storage it is pumped through loading arms to either road or rail tankers.

Traces of unconverted sulphur dioxide in the gas streams leaving the absorbers are removed in tail gas scrubbing towers before the tail gas is released to atmosphere.

Town water issued for sulphuric acid dilution. For cooling purposes clarified river water from the Mersey at Fidler's Ferry, two-and-a-half miles away, is brought to the plant in a 24-inch underground pipeline, while the effluent is taken back to the river by 36-inch main drain, believed to be the largest alkathene drain in Britain.

ALABAMA

Greenmont Liquid Fertilizer Co., Inc., Montgomery, incorporated with $4500 stock subscribed of $10,000 capitalization. Incorporators: **Charlie F. Loftin, Jr.; T. O. Boothe; John B. Loftin.**

CALIFORNIA

Standard Oil of California will undertake a $16,000,000 fertilizer program at Richmond, according to **T. S. Petersen,** president. The plans include a new ammonia and nitric acid plant, and **California Spray-Chemical,** a subsidiary, will build a plant to convert ammonia and nitric into fertilizer. The capacity of the combined facilities is 300 daily tons of ammonia which will be converted into both pellet and liquid forms. Completion is expected by mid-1956.

IOWA

Tiger Chemical Co., Onawa, are marketing high analysis liquid mixed fertilizers with a dye to distinguish one analysis from another. They point out that insecticide sprays can be easily mixed with the fertilizer, either at the plant or on the farm. They feature 15-15-0; 8-24-0, 9-9-9 in their advertising as typical "numbers" and point out to the farmer that pound for pound that liquid has the same plant food as dry fertilizer, so that 10 gallons equals 100 pounds. Their fertilizer has a pH of 7 "and can therefore be used on any type of sprayer." Tiger is operated by **Charles Holmes,** president; son Jules is vice-president; **Grant Holman** is sales manager.

* * *

Stanton Fertilizer Co., Red Oak, has set up two 10,000 gallon liquid nitrogen tanks. **Leonard L. Lindquist** is manager.

* * *

Radco Fertilizer Company, Creston, has opened to do custom business in liquid fertilizers. **J. Howard Brown,** who has had considerable experience in the nitrogen field, heads the operation.

New Research and Development Laboratories have been recently completed at Leith, Edinburgh, for the Scottish Agricultural Industries Limited, to provide a full scientific service within the company and to insure that new research discoveries, wherever they are made, are examined and utilized.

Comprising five old-established Scottish companies, each more than one hundred years old, in association with Imperial Chemical Industries Limited, Scottish Agricultural Industries employs nearly 3,000 people throughout Scotland, and manufactures about two-thirds of the fertilizers produced in that country. Main block of the new S.A.I. Research and Development Laboratories consists of two floors, containing laboratories, workshop, storerooms, library, offices and cloakrooms.

Poeshiek - Jasper Farm Service, who have completed a new bulk fertilizer warehouse at Grinnell, held an annual meeting and open house during which a new liquid nitrogen applicator was displayed. They are completing a 22,000 gallon installation at Newton.

ILLINOIS

LaSalle County Supply Company, LaSalle has announced the plan to build a new bulk fertilizer warehouse at Streator, construction was to begin the first of this month.

* * *

Duesterhaus Farm Supply Co., Quincy, has applied for city permission to manufacture dry chemical fertilizer in the former C.B.&Q. Railroad roundhouse, and to install a 30,000 gallon anhydrous ammonia tank.

* * *

Aylward Fertilizer Co., Sullivan, who just opened a liquid fertilizer operation at El Paso with a program of entertainment and a plant tour, are now planning a third plant at Havana. This is to be able to produce 300 daily tons.

INDIANA

Shue Spray Service, Warsaw, has established a plant to produce a balanced liquid fertilizer, **Jay Shue** is the owner.

V. W. Norris & Son report very little damage from the fire which recently hit their plant at Rushville.

LOUISIANA

Freeport Sulphur Company has begun production of sulphur at a new mine in the swamplands of Louisiana, the company announced March 10.

The mine, known as Chacahoula, is located near the town of Thibodaux, 50 miles west of New Orleans. Its development is part of a $25,000,000 expansion program involving four new mines with a combined productive capacity of more than three quarters of a million long tons per year.

Chacahoula is set in the midst of a dense 100,000-acre cypress swamp. The site had to be cleared and drained before construction of facilities and drilling of wells could be gin.

The facilities include a power plant to supply superheated water, compressed air and electric power for the Frasch mining process, an office, machine shop, warehouse, relay station, cooling plant, and storage and loading facilities. The plant has a normal capacity of 3,000,000 gallons of superheated water a day for injection into the deposit to melt the sulphur in place.

Other new Freeport mines are Garden Island Bay at the mouth of the Mississippi, Bay Ste. Elaine, a marine operation in the marshlands 40 miles south of Chacahoula, and Nash, a small property in Texas. The company also operates two other mines, Grande Ecaille in Louisiana and Hoskins Mound in Texas.

* * *

Flo-Mix Fertilizers Corporation, Wilmington, Delaware, has been granted a Louisiana charter.

MASSACHUSETTS

A March 23 fire at the **New England Rendering Co.** plant in Brighton is being investigated by an arson squad. Bagged goods and bagging machinery were destroyed by the blaze, with damage estimated at $10,000.

MISSISSIPPI

Jackson Fertilizer Company, Jackson, on March 4 began production with their combined granulation and powdered unit—20 to 30 hourly tons—designed by **D. M. Weatherly Company,** Atlanta, Ga. and met designed production rate immediately.

* * *

Lincoln Service & Supply, Inc., Grand Island, put into production their **Weatherly**-designed 15-ton per hour granulation unit February 8. President **Howard Peterson** reports: "Mr. **Weatherly** arrived in Grand Island Monday noon; made adjustments; started up the plant after lunch Tuesday; watched operations through Wednesday morning. The plant immediately met designed production rate, and has done so continuously since."

MISSOURI

Southeast Missouri Chemical Company, Hayti and Portageville, has been formed to take over the **Southeast Missouri Fertilizer Company,** with anhydrous ammonia distribution points at both cities. General manager is **Fred Greenwell.**

NEBRASKA

Green-N82, Hastings, has been incorporated to handle anhydrous ammonia, with $26,250 authorized capitalization. **Jack Halloran** and **Calvin J. Christensen** are listed as incorporators.

* * *

Farmers Grain and Supply Co., Ord, expect to complete this month a $15,000 anhydrous ammonia operation with a 30,000 gallon tank.

NEW MEXICO

Freeport Sulphur Company and **Pittsburgh Consolidation Coal Company** have announced a joint undertaking to produce potash from a substantial deposit near Carlsbad.

A new company, **National Potash Company,** has been formed to conduct the undertaking, according to the announcement by **Langbourne M. Williams** and **George H. Love,** respective presidents of the parent companies. **Richard C. Wells,** Freeport vice president and controller, will be president of **National Potash. Thomas G. Ferguson,** formerly a vice president of one of **Pittsburgh Consol's** divisions, will be operating vice president of the new company.

The project, including mine, plant and related facilities, will call for an estimated capital outlay of $19,000,000. National Potash has arranged to borrow $12,500,000 from an insurance company, and Freeport and Pittsburgh Consol will each supply half of the remaining capital requirements. The facilities will be designed to produce potash containing the equivalent of approximately 250,000 tons of potassium oxide per year.

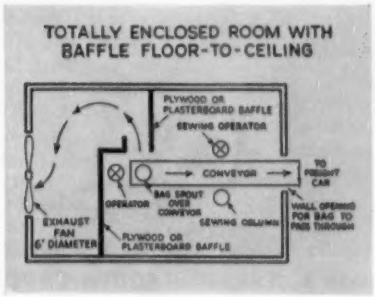
* * *

Farmers Chemical Resources Development Corporation, a new company, has been formed to develop

The old man says we can quit wire-tying our Multiwalls now that Union's licked our corrosion headaches...

A PHOSPHATE PRODUCER was compelled to wire-tie his Multiwalls at high cost because his product corroded the equipment needed for a sewn closure.

Union's Packaging Service Department redesigned his plant layout, relocated the exhaust fan and conveyor, and built baffles, as shown in the diagram. Change-over expense was less than $100. The processor then was able to install sewing equipment which reduced both bag and packing costs and produced a better package.



Are you making the most of your Multiwalls? Union packaging engineers will survey your present bagging system and make practical recommendations. It's part of Union's regular service to all Multiwall users.

UNION MULTIWALL BAGS

WHEN YOU GET DOWN TO CASES, UNION SHOWS THE WAY

UNION BAG & PAPER CORPORATION
WOOLWORTH BUILDING, NEW YORK 7, N. Y.

13,000 acres of potash lands in Eddy and Lea Counties. The operation is jointly undertaken by **Farmers Union**, Denver; **Kerr-McGee Oil**, Oklahoma City—and **Phillips Petroleum** have bought a half interest in Kerr-McGee, which gives them a quarter interest in the operation. Surveys indicate that the property may have a net value of $100,000,000.

* * *

International Minerals & Chemical expect to have in production during the coming fertilizer contract year additional facilities at Carlsbad which will boost potassium sulfate production 40,000 annual tons to 150,000.

NEW YORK

International Minerals & Chemical have completed the $2,000,000 expansion program at Niagara Falls.

* * *

GLF Soil Building Service expect to start operations about the end of the year in the new, completely modern fertilizer plant at Big Flats, on which construction has been started by **Fertilizer Engineering & Equipment Co.**, Green Bay, Wisc. According to **James E. Madigan**, FE&E president, the plant will produce granular fertilizer, and incorporate facilities for storage of bulk and bagged product, plus the most modern handling equipment.

OKLAHOMA

Phillips Petroleum Company's agricultural demonstration project, near Foraker, reports the establishment of a nursery where native and introduced grasses and legumes can be studied. Planting operations are now under way.

With the counsel of grass specialists of the area, a great number of species and varieties of grasses and legumes are being planted at the demonstration project. Summer plantings of 1954 include five selections of Bermuda grass, all of which appear to be adapted. The three selections showing the greatest vigor include Greenfield and Midland, both selected by Oklahoma A & M College specialists, and Grissom's Special, a local selection made by the Soil Conservation Service's area range specialist.

Possibilities of adapting the various plant species to a revegetation program will be studied. Also response of the plants to nitrogen materials, as well as other plant nutrients, will be noted. Range specialists and students are encouraged by Phillips to make their own observations at the Foraker project.

* * *

Miami Fertilizer Co., Trebein, has stepped up production with added granulation equipment, according to **Russell Martin**, president.

PENNSYLVANIA

Farm Chemicals Inc. Lynchburg, Va., have established a new distribution point for liquid nitrogen at Columbia, with a 23,400 gallon storage tank. The concern has been in business three years and operates in Virginia and the Carolinas, the Columbia plant being number 6. Expansion into Florida is next on the schedule.

SOUTH CAROLINA

Pee Dee Chemical Corp., Kingstree, has been chartered to manufacture and distribute agricultural insecticides, with capital stock of $25,000. **R. I. Snowden** is president.

SOUTH DAKOTA

Farmers' Fertilizer and Chemical Company has been opened at Mitchell by **William S. Shannon.** They will supply solutions to farmers on a do-it-yourself basis, supplying the applicator, or arranging for custom application.

TEXAS

The first water movement of anhydrous ammonia and the first ocean-going movement from **Phillips Chemical's** terminal on the Houston Ship Channel took place last month. The first went to Memphis, to **Mid-South Chemical;** the other to **Ochoa** Fertilizer, at Guanica, Puerto Rico.

* * *

Farmer's Fertilizer Company, Inc., San Antonio, has been chartered with capital stock of $20,000. Incorporators are: **A. Farrer, Ben E. Norris** and **W. D. Evans.**

TENNESSEE

Soil Builders International Corp. has begun production in its Clarksville plant of "Glorion". The plant has recently been quadrupled in capacity. Glorion is a processed carbon humus containing NPK and trace elements, plus a supply of calcium. The company, whose headquarters are in New York City tells of thick grass grown in a sand and gravel put with 30 pounds of Glorion applied per 1000 square feet before seeding.

* * *

Fertilsoil Corp., Memphis, has been chartered with 1,000 shares of capital stock, listed at $100. Incorporators: **John Costen, Thos. H. Durham, Jr.** and **L. F. Helms,** who have also incorporated the **Great Southern Compost Corp.**, also at Memphis.

VIRGINIA

Nitrogen Division, Hopewell, have installed two **Hortonspheres,** each sixty-five feet in diameter at a cost of $476,000.

WASHINGTON

Columbia River Chemicals Pasco plant is under way. **Fluor Corp.** has already begun preliminary work at the site and with engineering and construction blueprints. Mid-1956 is the estimated date of completion. There have been rumors that the $12,000,000 ammonia plant might not be built, but officials deny this.

* * *

Shell Chemical held a formal opening, middle of last month, of their new anhydrous ammonia facilities at Pasco.

* * *

Natural Fertilizer Corporation is spending $100,000 on a mixing plant at Ephrata, which should be in production this month.

* * *

Chas. H. Lilly Co., Seattle has announced the first complete fertilizer, especially formulated for balanced feeding of rhododendrons, camellias, azaleas, other broad leaf evergreens, and heather, according to **Lee Fryer,** manager, fertilizer division.

The new Lilly Rhododendron Fertilizer has 5% FTE content, and contains 4% magnesium oxide derived from sulphate of potash magnesia (sul-po-mag). Other ingredients include bean meal, single superphosphate, sulphate of ammonia, ammophos, sulphate of potash, sulphate of potash-magnesia, and sheep manure.

AFRICA

Phosphates Development Corp. expects to start operations this month at their new plant in the Transvaal, which will supply one sixth of the Union's total rock phosphate needs.

CANADA

Commercial Solvents Corporation will participate in a Canadian chemical project, it was announced by **J. Albert Woods,** president. The new company, known as **Northwest Nitro-Chemicals, Ltd.,** will manufacture and market high analysis nitrogen and phosphate chemical fertilizers.

Associated with Commercial Solvents in this venture will be **New**

British Dominion Oil Co., Ltd.; along with **Ford, Bacon & Davis, Inc.;** and **Frank McMahon** of Alberta. Northwest Nitro-Chemicals will be operated by Commercial Solvents under a long term management contract. The project will be located in southern Alberta.

In addition to the investment by Commercial Solvents and its associates in the new enterprise, the investment banking firm of Eastman Dillon & Co. proposes to raise the balance of the necessary funds through public sale of debentures and common stock, as well as the private placement of mortgage debt.

Northwest Nitro-Chemicals will be supplied with natural gas from the Etzikom Gas Reserve owned by **New British Dominion Oil Co., Ltd.** and **Mid Con Oil and Gas Co.** The prime contractor will be Ford, Bacon & Davis, Inc. of New York City, with Commercial Solvents serving as consulting engineers. Construction is expected to begin shortly, with completion scheduled for the latter part of next year.

* * *

Quebec Ammonia Co., Ltd. is building an $8,500,000 ammonia and nitrogen solutions plant at Contrecoeur, near Sorel, Quebec. **Lummus Co., Canada, Ltd.** have been awarded design and construction contracts. The plant, due to come into production in mid-1956 will turn out 125 daily tons.

* * *

Canadian Industries 1954 Ltd. is inviting bids on construction of an ammonia plant at Millhaven, Ontario to turn out 30,000 to 35,000 annual tons, using bunker C fuel as basic raw material.

* * *

Canadian Hydrocarbons Ltd is a $20,000,000 chemical industry to be established in Winnipeg to produce nitrogen fertilizer and develop a network of subsidiaries allied to the petroleum field.

COLOMBIA

Armour Research Foundation will establish in Bogota the first laboratory center in Colombia. It will undertake research in agricultural and other fields.

NETHERLANDS

Mekog. Amsterdam, is planning a plant said to be the first in the world to make fertilizer from crude oil.

Assures coke for India's Sindri fertilizer plant

In order to make the large Indian fertilizer factories at Sindri self sufficient in coke and to prepare the ground for further expansion in the fertilizer industry and in the production of by-product chemicals this new $5¼ million coke oven plant was officially dedicated by the Bihar Chief Minister, Dr. Srikrishna Sinha last November, some three months after it went into production.

Consisting of 60 10.5-ton ovens built in a row, the new coke oven battery has a rated capacity of 600 tons per day and this output was achieved within two months after the plant was put into commission. In addition, the plant will produce daily some 10 million cubic feet of coke oven gas, 32 to 35 tons of tar and two tons of ammonia. Certain other by-products will also be obtained after processing.

Built by the West German firm of Carl Still, G.m.b.H., of Recklinghausen, the plant is designed to be operated either by the conventional top-charging or by the stamping process, which will permit coals with relatively poor coking properties to be turned into a first class coke for the purpose of the Sindri Fertilizer Factory. By the second method, it will also be possible to obtain 16 to 18 per cent more coke oven gas than by using metallurgical coking coal. This is of prime importance since, when Sindri's further expansion schemes are materialized, the entire quantity of coke oven gas produced will be used as a principal raw material for the synthesis of other fertilizer products such as urea and double salt ammonia nitrate sulphate. Plans for setting up a plant for the production of these chemicals are in an advanced stage.

It is estimated that the additional food produced in India as a result of the application of Sindri fertilizers over the last three years could be valued at $105 million. Production of fertilizers here has helped the Indian Government to save foreign exchange to the sum of $42 million.

Sindri Executive Visits South Point

A recent visit by Rajagopala Jagannathan, director of ammonia synthesis at India's giant Sindri fertilizer and chemical plant, to the South Point (Ohio) plant of Allied Chemical & Dye's Nitrogen Division was the subject of an interesting article in the current issue of "Nitrogen Division Life," an employee news publication.

After five days of touring the South Point installation, the visitor was quite impressed by the democratic and informal methods of supervision which we have in this country. Contrasting this supervisor-employee relationship with that in his own country, Mr. Jagannathan explained how the ancient caste system still has a marked effect on contracts between the supervisors and their workers in India. The plant manager, for instance, is never seen except by those who work directly under him. Other supervisors also

have little personal contact with those under them because of distinctions established by the caste system.

A Nitrogen Division representative who has visited India is quoted by the publication as reporting that the Indian government is making efforts to promote closer relationships between supervisor and worker, although workers currently accept the distant relationships as a matter of course.

Mr. Jagannathan's visit to the South Point facility was sponsored by the U. S. Foreign Operations Administration in cooperation with the Indian government. Purpose of the extensive plant tour was to study methods of producing ammonium nitrate and especially urea in connection with India's consideration of building one or more plants to manufacture these products.

Local Level Reports

200 Attend Louisiana Plant Food Educational Meet

Approximately 200 persons interested in improved fertilizer practices attended the Fertilizer Clinic sponsored by the Louisiana Plant Food Educational Society in cooperation with the L.S.U. College of Agriculture on February 22. Represented at the meeting were farmers, fertilizer dealers, fertilizer manufacturers and several service institutions.

The meeting was opened by J. L. Lee, district agent, L.S.U. Extension Service. J. Y. Oakes, superintendent, Red River Experiment Station, presented the current cotton fertilizer recommendations for alluvial soils and Joe Sedberry from the North Louisiana Hill Station gave the cotton fertilizer recommendations for upland soils. It was pointed out that at the North Louisiana Hill Farm, Homer, magnesium fertilization increased the yields of cotton on all plots receiving equal nitrogen, phosphorous and potassium treatments. John A. Hendrix, superintendent, N. E. Louisiana Experiment Station, talked on corn fertilization for alluvial soils.

J. G. Marshall, L.S.U., discussed fertilizer recommendations for upland soils, pointing out that Louisiana farmers planted 590,000 acres of corn in 1953 which represented 14% of the total crop acreage of the state, and that the average yield for corn in Louisiana is now only 22 bu. per acre. He said the Experiment Station recommends for corn on soils of the coastal plains, Mississippi terraces and loessial hills the use of 400 lbs. per acre of 8-8-8, 6-8-8, 5-10-10, or 6-12-6 or their equivalents in higher grades before or at planting and side dressing with 50 to 80 pounds of nitrogen.

Dr. Gerald E. Wilcox discussed the time and rate of fertilizers on grass pastures and W. E. Monroe pointed out how soil fertility affected pasture renovation. He said that the Experiment Station recommended for upland pasture soils 30 to 40 lbs of elemental nitrogen, 60 to 72 lbs. of elemental phosphorous and 60 to 72 lbs. of elemental potassium per acre which would be equivalent to 600 lbs. of 5-10-10 per acre. It was shown that money invested properly in fertilizers returned $5.00 to $12.00 for every dollar invested. Mr. Monroe pointed out the trend to higher analysis goods and that Louisiana was only using one-half of the fertilizer it could use.

W. H. Patrick, L.S.U., talked on sub-soiling and deep application of fertilizer. Dr. W. J. Peevy, L.S.U., advised the group on the relation of lime to the soil fertility program. Acid soils were recommended lime and it was mentioned that soils with a pH of about 5.4 have given increases of 200 to 400 lbs. of seed cotton and about 7 bu. of corn per acre where sufficient lime was added to raise the pH to 6.5.

Dr. M. B. Sturgis, head of Agronomy Department, L.S.U., commented on the soil fertility program and T. H. Milliken pointed out the returns obtained from using fertilizers.

C. D. Shallenberger served as a moderator of a panel discussion on how fertilizer manufacturers view the present trend in fertilizer recommendations and practices. J. B. Snell, president, Minden Cotton Oil & Ice Company, Ltd., Minden, La.; Stanley M. Hackett, president, Dixie Fertilizer Co., Bossier City, La.; and Mr. Frank Boyd, Virginia-Carolina Chemical Corp., Montgomery, Ala. served on the panel.

A progress report of the Louisiana Plant Educational Society was given by J. B. Snell, director of the organization, followed by comments from Floyd Williamson, president of the Society and also president of Louisiana Agricultural Supply Co., Baton Rouge, La.

The meeting concluded with a drawing for several handsome door prizes such as electric roasters, toasters, clocks and fishing equipment.

Colorado Association Elects Fred Cherry

When the Colorado Agricultural Chemicals Association held their annual meeting and banquet, reports of the various committees were heard by the group during the morning session. The afternoon session was held in conjunction with the State Department of Agriculture and

KEY TO PICTURES

1. Where meeting was held in Shreveport, La. 2. Mrs. Edgar Fullilove, Shreveport, draws lucky door prize number for Harold Hamby, Chilean Nitrate, to present prize. 3. J. G. Marshall, LSU Experiment Station, S. Marshall, Shreveport, Dr. W. J. Peevy, LSU Exp. Station, Jack Timmons, Farm Editor and Announcer, Radio Station KWKH, Shreveport. In foreground, Good 4-H Club prospects—sons of S. Marshall. 4. Mr. & Mrs. Niven Morgan, American Potash Institute, and Joe Marsalis, Chilean Nitrate Sales Corp. 5. Representative Ford Stinson, D. E. Cummings, County Agent, Charles E. Roemer, Stanley Hackett, President, Dixie Fertilizer Co., R. C. Atkins, Jack Bagwell, Tenehu, Tex. 6. Jack Lindsey, Potash Div., Int. Minerals & Chem. Corp., Shreveport, W. G. Oden, Shreveport Fertilizer Works, Shreveport, Warner Anthony, Farm Service, Inc., Opelousas, La. 7. Coleman Martin, County Agent, Natchitoches, La., M. K. McConnell, Commercial Solvents Corp., Otis Jones, County Agent, Many, La., Warner Anthony, Farm Service, Inc., Opelousas, Dr. Gerald Wilcox, North La. Hill Experiment Station. 8. Dr. M. B. Sturgis, Head of Agronomy Dept., LSU, J. B. Shell, President, Minden Cotton Oil & Ice Co., Ltd., Stanley M. Hackett, President Dixie Fertilizer Co., Bossier City, La., Sheldon Appleton, Potash Co. of America, C. D. Shallenberger, Shreveport Fertilizer Works, Shreveport. 9. Harold Hamby, Chilean Nitrate Sales Corp., J. Y. Oakes, Supt., Red River Valley Experiment Station. 10. C. D. Shallenberger, President, Shreveport Fertilizer Works, Floyd Williamson, President, La. Agricultural Supply Co., Baton Rouge.

Colorado A. & M. College personnel, who represent the Colorado Agriculture Chemicals Clearing Committees.

The C.A.C.A. elected W. Fred Cherry, District Representative of Rohm & Haas Company, as their new President, Ralph Farr, of The Farr Company at Greeley, Colorado as Vice President, and Orvall Schall, of Schall Agricultural Chemicals at Monte Vista, Colorado, Secretary-Treasurer.

The two new Directors elected for two years were E. C. Stone, of E. C. Stone Company, and Robert Bowman, of General Chemical Company.

The Association attributes their success to the fine cooperation that exists between Industry and the Colorado A. & M. personnel, whose one goal is offering uniform products and uniform recommendations to the producer.

CFA Spring Conference at U of C, April 26

The 1955 Spring Fertilizer Conference, sponsored by the Soil Improvement Committee of the California Fertilizer Association, will be held on the campus of the University of California at Davis on Tuesday, April 26th. The banquet will be held that evening in the Rodeo Room, El Rancho Hotel, West Sacramento, and will feature Dr. H. J. Gramlich, an outstanding humorous speaker.

The program will open at 8:40 A.M. with all delegates assembled in the Chemical Auditorium. Speakers during the morning will include Provost Stanley Freeborn; B. H. Jones, President, and M. E. McCollam, Chairman of the Soil Improvement Committee, both of the California Fertilizer Association; Vern Frieman, Agricultural Agent, Whatcom County, Washington, on the Benedict Farm rehabilitation project; A. George Park, Balfour, Guthrie Company, Ltd., on California rangeland fertilizer demonstrations; Dr. Oscar A. Lorenz of the Agricultural Experiment Station, and Allen B. Lemmon, Chief, California State Bureau of Chemistry. The excellent new color motion picture in sound "California Grows with Fertilizer," which was produced jointly by the C.F.A. and N.F.A. will be shown.

The afternoon program will consist of four separate panel sessions. One will be concerned with pasture and forage crops and John Tollefson of Salinas will be the moderator. The other panel sessions will consist of discussions on vegetable crops with Weir Fetters, Stockton, as moderator; deciduous and citrus crops with Robert Whiting, Hayward, as moderator; and field crops with Ralph Waltz, San Francisco as moderator.

CFA 32nd Annual Convention

An outstanding program, with a minimum of formal speakers, is being arranged by the program committee for the California Fertilizer Association 1955 convention, to be held at the Hotel Mark Hopkins, San Francisco, on Monday and Tuesday, November 7 and 8.

N. C. Legislature Amends Fertilizer Law

The North Carolina Legislature March 25 complied with wishes of the fertilizer industry by enacting into law provisions that (1) methods of analyzing fertilizer shall conform to sound laboratory practices as evidenced by methods prescribed by the Association of Official Agricultural Chemists of the United States or by the Association of American Fertilizer Control Officials, and (2) penalties assessed by the agricultural commissioner for commercial fertilizer deficiency shall not be subject to claim after 12 months from the date of the assessment.

Bag size regulations for commercial fertilizers were also amended by the Legislature, effective March 7, to permit use of only 200-, 167-, 125-, 100-, and 50-lb. bags.

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First U. S. Sesame Food Plant Opens in Texas

Here is a development which may provide a profitable use for some of the acreage farmers must divert from production of surplus crops.

The first sesame food product plant in the United States is now in full operation at Paris, Texas.

Roy H. Anderson, president of American Sesame Products, which operates the plant, said today the combination plant and warehouse will be able to handle more than 6,000,000 pounds of sesame annually by next harvest time. American Sesame Products was organized last year to process and promote the new U.S.-grown sesame seed which can be used in a wide variety of ways.

Sesame, a staple food for centuries in India, China and the Middle East, is a new farm crop to this country. Dr. Forest H. Clickner, noted nutritional consultant, explains that "sesame is to soy beans what sweet corn is to field corn. Just as soy beans have assumed importance in the feeding of animals, so sesame appears to have a vast potential as a human food."

As recently as three years ago, only a few experimental plots of sesame were grown in the U. S. Last year, more than 1,200,000 pounds were grown in the cotton belt, under adverse drought conditions. The sesame boom was sparked by the introduction of a new variety of sesame developed by the Texas Research Foundation, Renner, (near Dallas) Texas, After six years of intensive work in plant breeding, under the direction of Dr. Earl Collister, the foundation succeeded in producing an improved variety which can be harvested by machine with a minimum of hand labor.

Big drawback to the expansion of U. S. Sesame production in the past has been the fact that sesame had to be carefully hand-picked. This picking, moreover, had to be done just before the seed pods reached full maturity. If the harvest were delayed, many of the pods would shatter, and the seeds would be scattered. Another problem was the fact that pods on the same plant matured at different times.

Now, however, with the development of semi-Shattering Varieties and the development of new cleaning and processing equipment by American Sesame Products, cultivation of sesame promises to be profitable in the U.S.

The president of the new company, Mr. Anderson, also is vice president of the Liberty National Bank of Paris. Treasurer of American Sesame Products is Liberty National Bank's president, J. G. Cecil, and the secretary is Robert L. Parker, who also is managing director of the Texas Sesame Growers Assn., an organization responsible for distribution of planting seed and information to farmers.

Sesame is a small seed about one-eighth inch across, and grows in a pod. There are from 75 to 100 seeds in each of the approximately 150 pods on one plant.

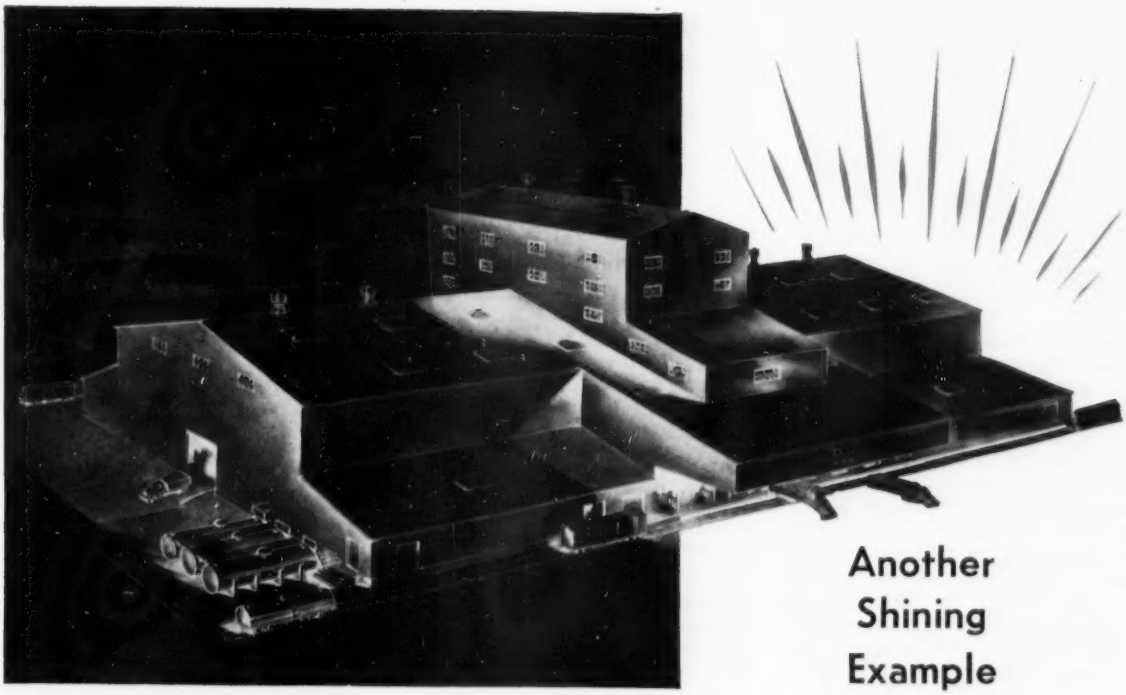
Sesame is used in a number of ways—as a seed to give a rich flavor to bakery goods, candy and other foods; as an edible oil for salad oils, margarine and shortening; and as a meal.

The oil is unusually stable and is so pure it requires relatively little refining. It is one of the two oldest oils known to man, the other being coconut oil. The seed has a nut-like flavor and the meal has five times the protein content of white flour. As a result, the meal is considered excellent for enriching other human foods. The seed is about half oil and the meal is about half protein.

Approximately a million and a half tons of sesame are grown annually, about half in China and a third in India. In the late 1930's, sesame cultivation was undertaken in several central and South American countries. About 7,000,000 pounds were imported annually by the United States from these countries, most of it being used on the East Coast for bakery and confectionery goods.

Oklahoma Land Judging

Farm youth and adults from 24 nations and some 30 states will participate in the fourth annual national land judging and the first annual national pasture and range contests at Oklahoma City, April 28-30. The first international land, pasture and range judging school will be held in connection with the contests.



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PERSONALS

Harry C. Moore, Director of Purchases (Fertilizer Materials) of Armour Fertilizer Works has announced his retirement, after 47 years of service, effective April 1, 1955. Mr. Moore started in 1907 as Assistant Chemist in the Atlanta Division Laboratory of Armour Fertilizer Works and became Chemist in Charge of this laboratory in 1908. In 1920 he became Chief Chemist of Armour Fertilizer Works and Director of Chemical Control. In 1926-27 Mr. Moore was the first to begin the commercial ammoniation of superphosphate and fertilizers using ammoniacal liquor (B-grade liquor containing 25% to 30% NH_3) and followed later by anhydrous ammonia and ammonia (nitrogen) solutions. This was a forerunner of today's ammoniation so largely used by the fertilizer industry. In this early work mineral acids, sulfuric and phosphoric, were also used with ammoniacal liquors to make granular fertilizers now coming into such general use. Several patents were issued in his name covering these various processes. In 1938 Mr. Moore became Director of Purchases (Fertilizer Materials) and later Vice-President and also Assistant Vice-President of Armour & Company.

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John E. Powell of the **Smith Agricultural Chemical Company,** Columbus, Ohio, has been elected chairman of the board. **William F. Farley,** formerly division manager of Smith's Indianapolis plant has been named successor to Mr. Powell, and will assume the presidency immediately.

• • •

A. M. Powell has been named Assistant production manager in charge of Eastern sulphur and insecticide plants for **Stauffer Chemical Company,** it has been announced by **Herman Jockers,** director of production. Mr. Powell will headquarter at Chauncey, New York, and will be responsible for Stauffer agricultural production facilities in New Jersey, Missouri, Arkansas, Texas, Louisiana, and Florida. The new appointment is effective immediately.

• • •

P. E. Simpson being unable to continue due to ill health, **Fruit Growers Supply Company,** Los Angeles, announces that **H. A. Thomas, Jr.** is promoted to general manager, and **L. A. Yoast** becomes assistant general manager, continuing as secretary-treasurer.

• • •

Consumers Cooperative, Kansas City, has named **Donald E. Ewing** acting assistant treasurer, and **J. P. Blair** controller.

• • •

Dr. William L. Garman has been named agricultural service manager for the **Deere and Company** plant at Pryor, Oklahoma.

Curtis E. Grace has resigned as vocational agriculture instructor after 22 years, to become manager of the **Missouri Farmers Assn.** plant at Albany, Mo.

• • •

After more than 50 years service with **J. Ross Hanahan,** the firm's president, and 49 years with **Planters Fertilizer and Phosphate,** Charleston, S. C., Johanna C. Friedell has retired.

• • •

P. H. Neal, president of **Ketona Chemical,** Homewood, Ala., has announced personnel for the new anhydrous ammonia plant to be constructed there: **Dana F. Sprague,** works manager; **H. J. Weiland,** assistant; **D. G. Sentman,** office manager and chief accountant; **Hursel L. Browning,** works engineer.

• • •

John Street and **Bill Tanner,** formerly with **Southeast Missouri Fertilizer,** are now with **Mid-South Chemical's** Portageville, Mo., operation.

• • •

Jerry Mitchell has been transferred to Des Moines to manage the **National Fertilizer** plant there. He will be succeeded at the Fairbury, Neb. plant by **Ted Doyle** who has been a salesman.

• • •

Tommie C. Duffie has become agronomist for the **Quality Fertilizer Company,** Chillicothe, Ohio.

Dr. Edwin C. Kapusta has been appointed technical service director of United States Potash Company effective July 1, 1955.

With NFA since July 1951 as its chemical engineer, he has served as Co-Secretary of NFA's Plant Food Research Committee, and has been active on the fertilizer technology subcommittee of the National Joint Committee on Fertilizer Applications.

L. A. Linville, left, has taken up duties as assistant director of sales for Bemis Bro. Bag Company, St. Louis, in the absence from that post of C. W. Akin, who is temporarily assigned to plastic bag development, and is succeeded as manager of the Bemis multiwall paper bag plant at Vancouver, Washington, by A. B. Williams, right, formerly sales manager there.

Virgil Rule, formerly with the **Agricultural Ammonia Institute,** has been made regional manager, vice president and director of **West Coast Chemical Enterprises Inc.'s** Pacific Northwest operation at Walla Walla.

• • •

Dr. Walter Reuther on June 1 will transfer from USDA's citrus laboratory in Orlando, Florida, to head the department of Horticulture, University of Florida, and the extension service.

• • •

Agricultural Chemicals division of **Shell Chemical Corporation** has opened a new sales office in Columbus, Ohio, **Frederick W. Hatch,** division manager, has announced. Under the direction of **S. J. Hastings,** district manager in New York, the office will be headed by **J. W. Hawke** with **C. J. Green** as technical salesman.

Responsible for sales of Shell Chemical insecticides, aldrin, dieldrin and endrin, the office will serve as headquarters for representatives in Ohio, Kentucky, Michigan and West Virginia. It is located at 1220 Goodale Boulevard; phone Walnut 1102.

• • •

It has been announced by Pacific Coast Borax Co., division of Borax Consolidated, Limited, that they have just opened a new district sales office in Kansas City, Missouri, the address being 4010 Washington Street. This office will be a district sales office for three divisions of the company: package, agricultural sales, and industrial sales. **F. M. Dosch,** assisted by **J. G. Neckerman,** will be in charge of the agricultural sales division.

• • •

International Paper Company has opened a new branch sales office in Denver, Colorado, it was announced by **F. Henry Savage,** vice president and general sales manager.

The new office, which is located at Room 908, Equitable Building, 17th and Stout Streets, Denver, will house representatives of three of the

New Alabama representative for Spencer Chemical is Ulay K. Wise, veteran farm service official who comes to Spencer from a three-year tour of duty with the State Department. Previous to that time, he was with the Veterans Administration in charge of a unit administering on-the-farm training program, and later was agricultural training officer. Mr. Wise had worked as assistant county supervisor with the Farm Security Administration before entering military service. He will headquarter in Montgomery.

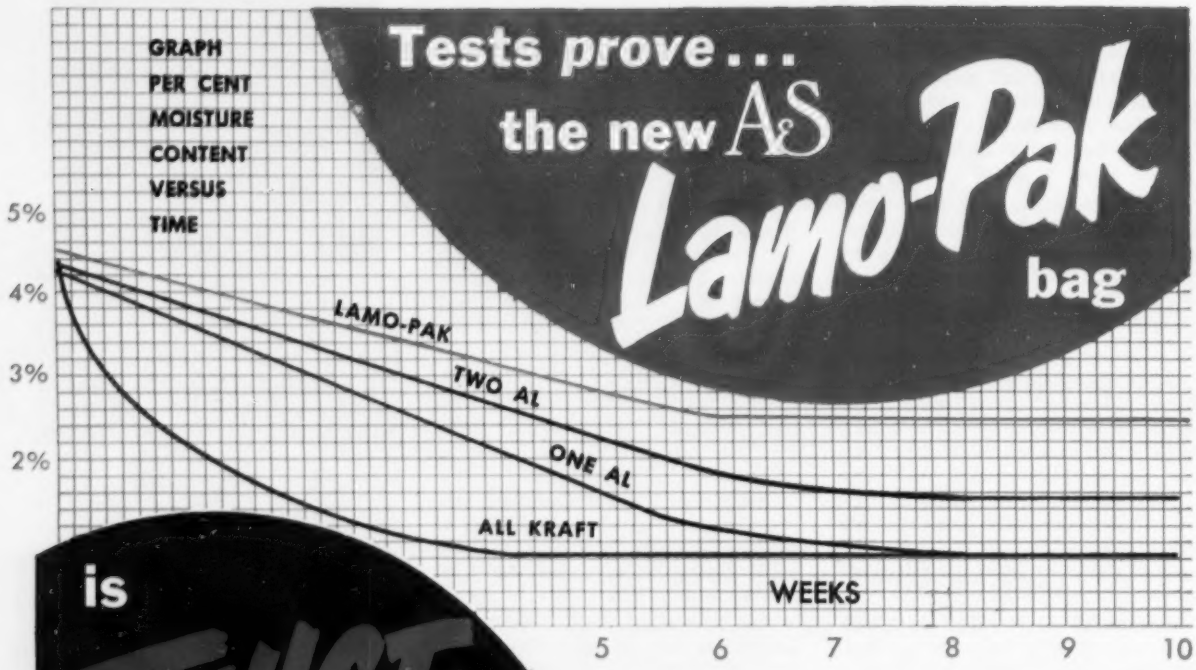
John A. Scott, who has been elected President of Sinclair Chemicals, Inc. petrochemical subsidiary of Sinclair Oil Corporation. Mr. Scott has been executive vice president and a director of Sinclair Chemicals since its organization in 1952 and a member of the Sinclair organization since 1934.
Mr. Scott also serves as a director of Sinclair Research Laboratories, and is a director of Calumet Nitrogen Products Company.

Ray F. Mickels who has joined the Agricultural Chemicals Sales Department of Commercial Solvents Corporation, to handle the sale and distribution of CSC Ammonium Nitrate to the mid-west fertilizer trade.
Mr. Mickels, who has been with CSC since 1951, will make his headquarters at Aurora, Ill.

Douglas A. Young, who has been appointed sales representative in the Chicago territory for Arkell & Smiths.

Arthur F. Miller (right), general manager Plant Food division for Swift & Co. since 1947, retired on April 1. He is succeeded by William F. Price (left) assistant manager of the Plant Food division since 1952. Miller began his career of 43 years at Swift as secretary to the manager of the Plant Food division. An expert gardner, he led the development of Swift's "Vigoro," and was instrumental in the selection of the term plant food as a substitute for fertilizer. Price joined Swift in 1925 at Calumet City, Ill., and became Pacific Coast sales manager in 1929. He later managed plant food factories at Ontario, Calif., and Los Angeles. He became manager of Vigoro sales in 1943, and general sales manager of the Plant Food division in 1949.

George W. Behnke, left, president of Simplicity Engineering Company, Durand, Michigan, who has announced a new Canadian subsidiary, Simplicity Materials Handling Limited, to be located at Guelph, Ontario. General Manager of the Canadian firm will be E. L. Whitaker, right, formerly Industrial Commissioner for the City of Guelph. The new Canadian subsidiary will sell, install and service all Simplicity equipment and maintain a full stock of replacement parts.



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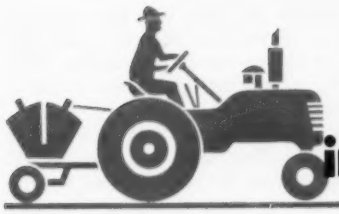

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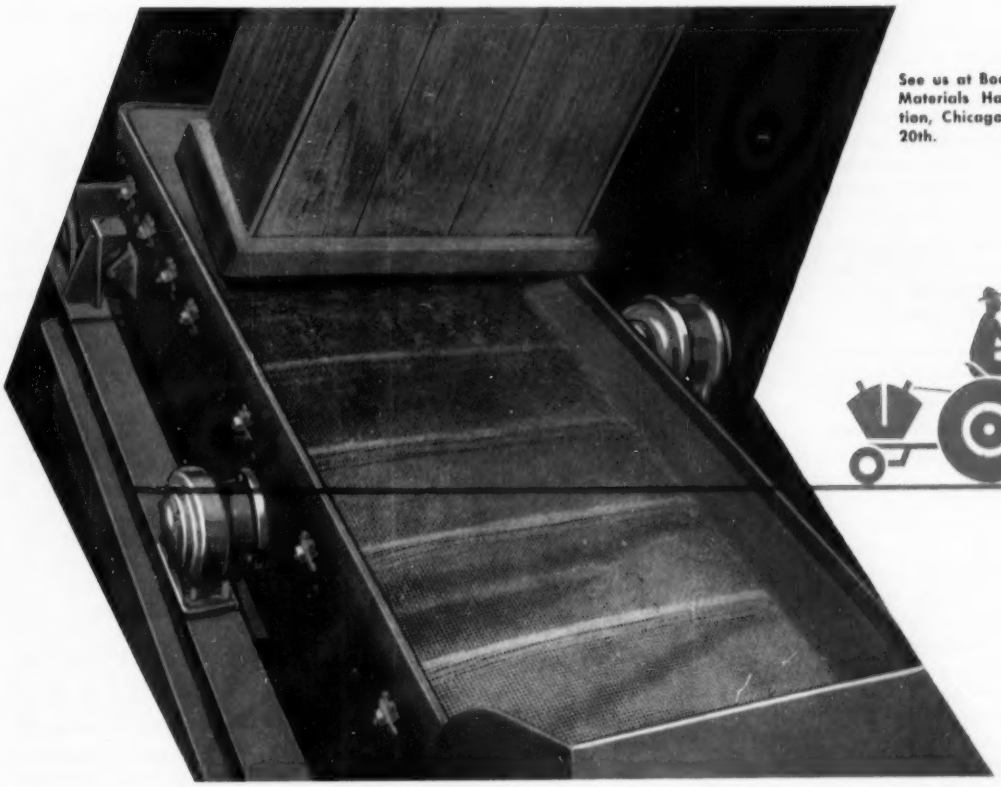

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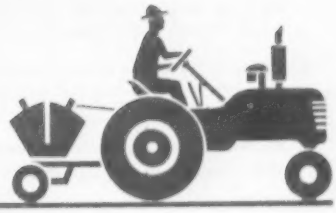

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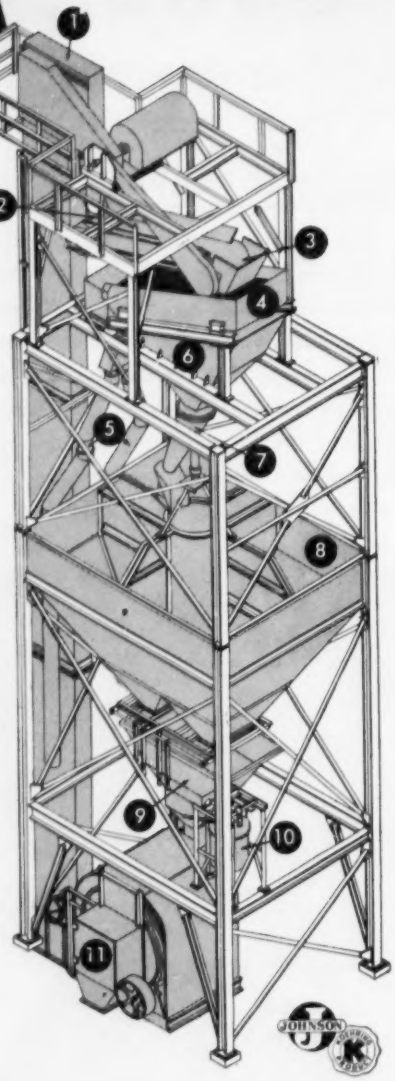

1. Chain bucket elevator feeds material into the plant at the rate of 1000 cu. ft. per hour.
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3. Self-cleaning belt conveyor carries pulverized material to screen.
4. Vibrating, 4x10-foot separating screen controls size of materials fed into collecting hopper.
5. Reject pipes return oversize material from screen to bucket elevator for re-sizing.
6. Collecting hopper under screen charges pivoted distributor.
7. Full-revolving distributor feeds screened material from hopper into sectional storage bin.
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Russell A. Gair, Jr., who was already located in Denver, will continue to represent the Bagpak division, makers of multiwall shipping sacks.

The opening of this new office brings to fourteen the number of branch sales offices operated by International Paper Company throughout the country. The others are located in Atlanta, Baltimore, Boston, Charlotte, Chicago, Cincinnatti, Cleveland, Dallas, Milwaukee, Minneapolis, New Orleans, Philadelphia and Syracuse.

• • •

George V. Dupont, chief staff engineer of the Central Engineering Department since October, 1954, has become manager of manufacturing operations for **Diamond Black Leaf Company,** which was recently organized by **Diamond** and **Virginia-Carolina.**

Mr. Dupont will be responsible for manufacturing operations at Diamond plants in Richmond, Va.; Louisville, Ky.; Montgomery, Ala.; and Waco, Texas.

ASA And SSSA Meet August 15-19

August 15-19 is the date set for the annual meetings of the American Society of Agronomy and the Soil Science Society of America to be held at Davis, California, according to an announcement from L. G. Monthey, executive secretary of the two groups.

An estimated 375 papers on new developments in crops and soils will be presented during the course of the meetings.

The president of the American Society of Agronomy is G. G. Pohlman, head of the Department of Agronomy at the University of West Virginia. M. B. Russell, head, Department of Agronomy, University of Illinois, is president of the Soil Science Society of America.

OBITUARIES

Raymond Hutchinson, manager & president of Trenton Bone Fertilizer Co., March 14 at Trenton, N. J.

Robert Quinn, 65, retired chemical engineer and sales executive of Mathieson Chemical, March 8 in Tucson, Ariz.

Claude M. Tingle, 61, state educational manager of the Chilean Nitrate Educational Bureau, February 19, in Jackson, Miss.

Safety Conference

The fertilizer safety movement is rapidly growing throughout the industry and this year's successful Southern Safety Conference fertilizer meeting in New Orleans Feb. 28-Mar. 1, was a good one. Those responsible for its success are to be complimented for their outstanding efforts.

The sessions were well attended and Curtis Cox, assistant manager of Manufacturing for Virginia-Carolina Chemical Corporation, Richmond, chairman of the section, presided for the two sessions. The two-day program was both varied and practical and offered a good balance of inspiration and information. Two of the talks are published in full in this issue—Workable Small Plant Safety Program, by Harold R. Krueger, production manager, Snyder Chemical Co., Topeka, and Safe Blasting Practices, by A. L. Foster, superintendent, International Minerals and Chemical Corporation, Spartanburg, S. C.

Highlights of the other talks are outlined as follows:

Safety—A Sound Investment; A. B. Pettit, supervisor Industrial Health and Safety, Davison Chemical Company, Div. W. R. Grace Co., Baltimore: As keynote speaker, he stated the basic case for safety when he said that a profit made in safety is just a welcome by-product. Always it had been his priviledge to work for corporations having a high sense of responsibility to their fellow man, recognizing that those who work on the firing line are the ones who take the brunt of the lack of a safety program—those men and their families. A good safety man, he said, should possess above all an earnest desire to do good for his fellow man—to want to create a safer place for him to work. And when this is done there is great personal satisfaction in doing a good safety job. From it also stems another by-product; the plants with good reputation are the ones getting the choice in the labor market. For every dollar cost in safety there are four more of indirect cost.

Report on Industry Activities—Vernon S. Gornto, manager, Insurance Department, Smith-Douglass Company, Inc., Norfolk: Prefacing his remarks with a brief review of the Fertilizer Safety Section's growth beginning with a meeting in Roanoke, Virginia in 1947 at which a group of ten met representing six companies to organize industry members in this state to date. Regarding immediate plans, he said, "We are now undertaking the organization of a Fertilizer Safety Section for the fertilizer plants in the State of Florida—it is our hope that the manufacturers in this state will get in behind our industry safety program for their own good and the good of the industry as a whole. Bill Stone is working to effect such an organization, and we are in hopes it will be completed by October. This will leave us only the state of Georgia to organize, and we will then be 100% on the coast from Maryland to Florida. Then, we hope to go West and take in the states of Louisiana, Mississippi, Arkansas, Texas and in fact, each of the 17 states in the Southern Safety Conference.

"John Smith is now undertaking the organization of a regional safety group in the fertilizer industry in the Midwest. This will take in some half a dozen states.

"There have been 13 additional fertilizer companies who have affiliated with the Fertilizer Section of the NSC since our last Congress in October. One of the most recent companies to affiliate was the Taiwan Fertilizer Company, Ltd., of Taipei, Taiwan (Formosa), China. Mr. Yen Srew, chief engineer with this company hopes to be present at our meeting in Chicago this October. Also, we expect to have a new member soon from Buenos Aires.

"We plan a continuous, concentrated drive for new members from now until October 17. If there are any of you whose companies are not now members of the National Safety Council, I hope you will remedy that situation soon."

Tom Clarke, G.L.F., Ithaca, N. Y., editor and chairman of the fertilizer section of the NSC, was unable to attend due to illness in his family but sent along his paper titled "I Believe" which was read by Curtis Cox. It was a fine inspirational presentation—(Tom is noted for his "Talks with a heart" and a ready fund of very appropriate stories).

Handling Ammonia Solutions Safely—Charles L. McDaniel, technical service supervisor, Lion Oil Company, El Dorado, Ark.: The real and best answer to every problem in proper handling of solutions is "to see your solutions man." Many examples were given showing various trouble spots and how to cope with them. The real problem is that no two problems are alike, so your best bet is to get your solutions man to iron out the trouble. (A recap of safety pointers promised us for publication didn't make our April deadline).

F. Wayne High, manager of Operations, Baugh Chemical Company, Baltimore, led a discussion period following each meeting, and in addition to questions asked from the floor and answered by the speakers, other subjects were discussed. Relative to the safety contest, the forms sent in furnish statistical evidence on number of days and lost time accidents—169 locations are now reporting . . . Big safety badges for safety committee men in the plant has proved a help in plant safety . . . A penalty box is a help in cutting accidents, serving to make those in the plant more safety minded . . . A. L. Foster said they were 100% sold on physical examinations for employees—in his plant last year the cost was $200 but results have proved it a program every plant should follow . . . On the question as to whether older or younger employees are more accident-prone it was agreed that age was not a factor of importance . . . On the subject of incentive programs to encourage plant safety—oyster roasts, etc.—opinions were both pro and con,—it's a good idea except for the danger that some employees might cover up some accidents (not reporting) to keep the record clean.

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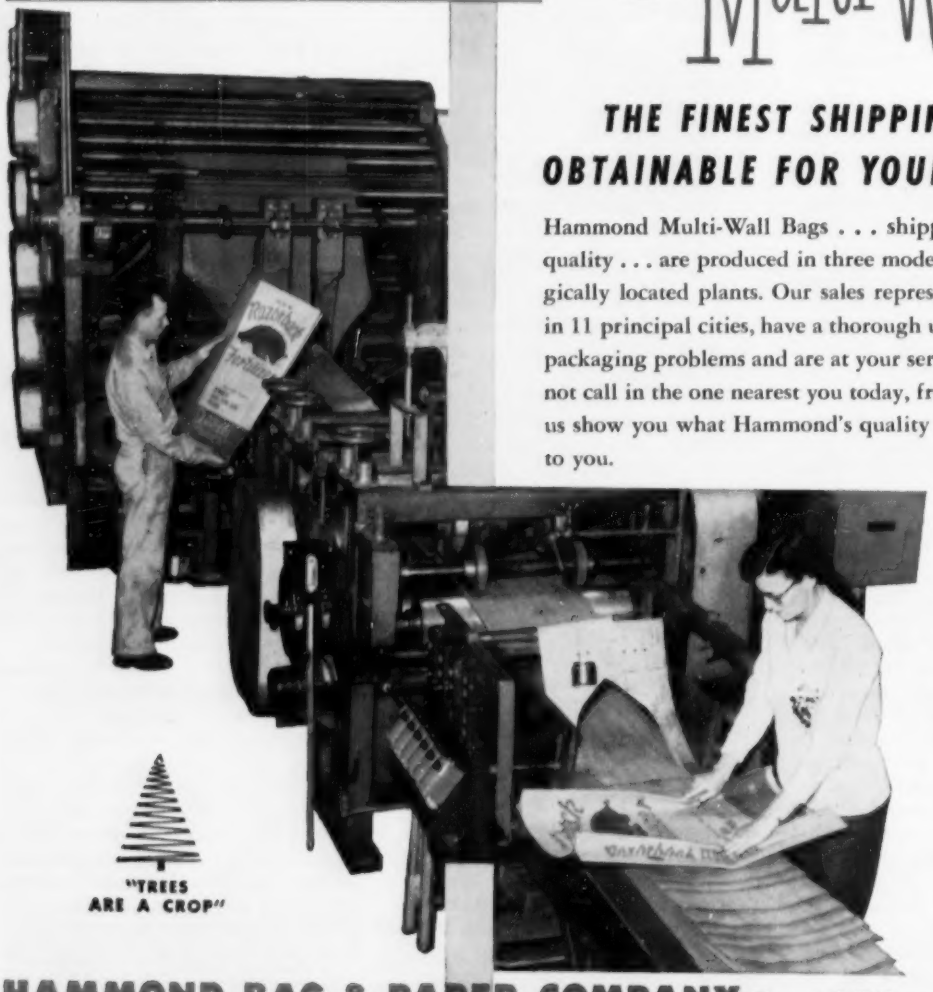

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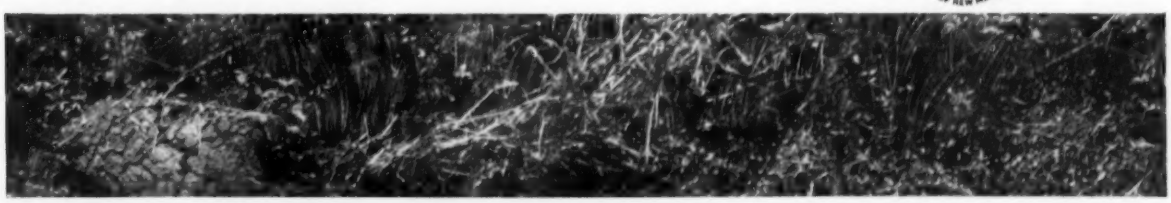


WORKABLE SMALL PLANT SAFETY PROGRAM

Presented At Safety Meeting By HAROLD KRUEGER, Snyder Chemical Co.

It is a pleasure to be with you, here in New Orleans, and to be permitted to talk with you about a workable safety program for the smaller fertilizer plant. Those of us who happen to be on the Executive Committee of the Fertilizer Section of the National Safety Congress are well aware that to do a good safety job for the entire fertilizer industry, we must get the cooperation of all of the individual producers. At almost everyone of our committee meetings, the problem of getting the safety program across to the smaller producer of fertilizers is discussed and ways and means to get him interested are brought out.

Personally, I am always somewhat amazed and a little disappointed to find that many people believe that the owners and operators of some of the smaller plants have to have special treatment to interest them in safety or that they are not interested in the lives and welfare of their employees. Is the loss of earning power of any man, through injury, less keenly felt by his dependents simply because he happens to work in a small plant and not a large one? Is the life of a husband, son or brother less grieving to his family because he did not work for a multi-million dollar corporation? Does the operator of the so-called small plant, when notified of an injury to one of his employees, say—"Oh well, that is to be expected, he's just working for a little outfit?" I find it difficult to believe that we in the fertilizer industry are so callous that these attitudes are general throughout the owners and operators of our more modest sized plants.

Now, I must admit that when I have made personal attempts to interest the smaller plants in a safety program, or joining the Fertilizer Section of the National Safety Council, that I have quite frequently heard the statement: "A safety program is easy for the big operators who can afford a full-time safety engineer, but it is more difficult for me to do it, and still run my business." It is, no doubt, a great help to be able to afford the services of a full-time safety engineer. The contributions of these men to the advancement of accident prevention cannot be denied, but are their results not due to the fact that they have the true conception of what safety means?

What is safety? First of all, it is an idea, a thought, a state of mind, that **every** movement or action **can** be performed in a safe manner. Second, it is an intention, to force the body to perform the actions in the safe manner which the idea has already generated in the mind. This is safety, reduced to its most elemental components. It takes only a modest amount of time to train our mind to function in this manner, and we soon find that we have become what is generally defined as safety conscious. Having arrived at this happy state, it is not difficult to transmit these ideas and intentions to those working with us and for us. If we are operators of a business, be it large or small, I do not think we would be too conceited to assume that ultimately every job or task performed in our plant is the fruition of an idea or intention that we have had. If it was our idea to enter the fertilizer business, to manufacture and sell a ton of fertilizer, can it not also be our idea to carry out these operations in a safe manner?

Since we are discussing a safety program for the smaller plant and acknowledging the fact that we cannot afford the services of a safety director, it is then normal to assume that the owner or operator personally supervises many of the operations. He then is the top man in our small plant safety program. Being primarily a businessman, when it is recommended to him to instigate a safety program in his plant, his first questions are: "What does it cost and what are the returns?"

What are the costs of a small plant safety program?

1. **Time:** The amount of time will, of course, vary with the individual and also how sincere he is about making the program go. If a person desires to be safety conscious, (and he must be to sell the program down the line) it requires no more time to think of a safe way to perform a task than a careless way. The same mental processes are involved. It takes but a few seconds more to instruct a foreman or worker to perform a task safely than to just issue the order for work to be done. Everytime you walk through the plant, observe how the men are working as regards to safe practices. Look especially for slipshod methods and careless attitudes. Take a few extra seconds to inspect machinery for danger points that might be provided with guards. Insist on good lighting and good housekeeping. A few extra minutes a day will do the job, and also impress upon the workers that you, personally, are sold on safety.

2. **Money:** The returns for the reductions of accidents are so great that it is almost absurd to think about the costs. A few dollars for machinery guards, replacing some worn steps or dangerous ladders, a few extra lights and a couple of good brooms will do wonders for your plant. We would also like to suggest the expenditure of $25.00 per year for a membership in the Fertilizer Section of the National Safety Council. A $25.00 membership covers up to 99 employees, and an opportunity to attend the annual safety congress held every October in Chicago. You will find our annual meetings to be instructive, inspirational and well worth the time and money spent for attending.

3. **Returns:** Sometimes I get just a little bit aggravated when a lot of stress is placed on, "What do I get out of a safety program?" What do you get out of helping a blind man across a street, helping an elderly person on a bus, visiting a sick friend? What has happened to the Golden Rule? Are we hiding behind Cain's infamous statement, "Am I my brother's keeper?" It didn't help Cain. It seems to me that the satisfaction derived from having a busi-

ness in which people can find safe, healthful and happy employment would alone be enough repayment for the small cost of maintaining such conditions in the plant. Of course, there are returns, returns in increased production due to greater efficiency of the workers; returns in decreased maintenance costs due to more care being exercised in use of equipment; returns in reduced premiums of compensation insurance due to rates being based on lowered accident frequency; returns in less shrinkage of saleable materials due to better housekeeping and returns in overall morale of the worker due to better working conditions.

Are these not enough incentive for you to want a safety program in your plant? You, top management, are the one who must first want the program, because you are the one who must head it up. What are the tools required to build the program? Just three are necessary: time, a little money and men. We have discussed the time required of you and also the money, so the third and most necessary are the men.

Curtis Cox, Chairman of the Fertilizer Section Southern Safety Conference, New Orleans, sprung a surprise at the Section's first meeting on February 28th when he presented the Geiger Award to the Gretna, Louisiana Plant of the Davison Chemical Company, Division of W. R. Grace & Co. In presenting the award he pointed out that by working six years from February 5, 1949, to February 5, 1955 (327,504 manhours) without a disabling injury the Gretna Plant had positively proved that the objective of the Fertilizer Safety Section could be obtained. The award was accepted by A. J. Brewer, Superintendent of the Gretna Plant, on behalf of all employees.

Left to right are: A. B. Pettit, Administrator, Industrial Health & Safety, Davison Chemical Company, Division of W. R. Grace & Co., Baltimore; Mr. Cox; Mr. Brewer; J. W. Ground, III, District Manager, Davison Chemical Company, Division of W. R. Grace & Co., Joplin, Mo., and E. M. Harold, Manager of the Gretna Plant.

NOTABLE QUOTES

"The smaller plants are the ones with the highest frequency rate and the highest Accident Costs" . . . "Any company can greatly improve its own Safety record and greatly reduce the cost of Workman's Compensation insurance Premiums by supporting an active and successful Accident Prevention Program within its own organization."

Vernon S. Gornto

Regardless of how small your plant may be you certainly have some kind of superintendent, foreman or leader to carry out the day by day operations. This man is your usual contact with the crew and in order for him to help you make a safety program go, he must be sure of two things: first, that you actually believe in the program yourself, and second, that it is part of his job to see it carried to the men. So this man is your first job. Convince him that in order for the plant to perform any operation efficiently, it must be performed safely. Impress upon him that the elimination of accidents is the greatest cost-cutting factor he can employ. Be sure that he realizes that the workers whose efforts he directs are human beings, free Americans who should have the privilege of earning their livelihood in the best of working conditions. The foreman is the keystone in the arch of safety.

How do we reach the worker? Performing any task in the safe and proper manner is a matter of education. There are two methods of education, visual and oral. We learn by seeing and hearing, and no doubt, seeing is the most effective. The foreman should know the correct and safe way to perform all the physical jobs the men are called upon to do. He should make it a point to personally instruct each man in his job. The foreman should know every danger point in the plant and see to it that workers know how to safely perform at danger points. There are danger points in the way a bag is lifted, as well as in using dynamite or operating a tractor shovel. New employees need special attention. Not only are they strange to the operations, but there is a good possibility that they have never performed this type of job before. Careful instructions and **examples** to the new employee will prevent many injuries later.

Regular safety meetings for the entire plant crew are of great value. Management should never fail to be present at these meetings. Our own company experience indicates that luncheon meetings are the most effective. We furnish the entire crew with sandwiches, coffee or soft drinks and dessert. After eating, we have a short program. Every other program is a "case history" affair during which any employee who was involved in an accident, or near-accident, is required to tell what happened, what caused it and how he thinks it could have been avoided. If any other employee was known to have witnessed the occurrence, his version is also called for. If no specific incidents have occurred to discuss, then a question and answer period is used, regarding possible hazards in the plant. The first or second meeting of this type seem to fall rather flat, as it is difficult to get the men to talk, but soon you will find you almost have to limit the discussion to keep from running over time.

We use our insurance carriers as a source of material for other of these safety luncheons, either to furnish a speaker, a film or both. We find our insurance people to be most cooperative in furnishing men and material for this purpose.

A "no lost time accident" sign, with changeable numerals for the days involved and other visual aid posters and warning signs have a definite place in a safety program. A word of caution, however, on these. Keep them clean, up-to-date and posted in places where they can be seen.

Proper maintenance of the plant and machinery is a great contribution to the reduction of accidents. Tractor shovels with faulty brakes and worn steering have caused many an accident or at least, damaged equipment. Acid and ammonia have caused many injuries, largely due to leaking lines, valves, pumps and fittings. The use of goggles or face

Top row: Harold R. Krueger, Synder Chemical Co., Topeka; Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond; Vernon S. Gornto, Smith-Douglass Co., Inc., Norfolk; A. B. Pettit, Davison Chemical Co., Baltimore; F. Wayne High, Baugh Chemical Co., Baltimore. **Bottom row:** Charles L. McDaniel, Lion Oil Co., El Dorado; C. W. Nelson, University of Chicago, Chicago; Alton L. Foster; International Minerals & Chemical Corp., Spartanburg; R. G. Diserens, Phillips Chemical Co., Bartlesville; Frank Kruck, Virginia-Carolina Chemical Corp., Richmond; William A. Stone, Wilson & Toomer Fertilizer Co., Jacksonville; William C. Creel, N. C. Department of Labor, Raleigh.

SCHEDULE OF SAFETY MEETINGS

North Carolina—Winston-Salem—May 19—Robert E. Lee Hotel

Maryland—Baltimore—May—Lord Baltimore Hotel

Virginia—Richmond—June 3, 4—Jefferson Hotel

Executive Committee—Roanoke—June 12—Roanoke Hotel

South Carolina—Charleston—November 3, 4

National Safety Congress—Chicago—October 17, 18

Southern Safety Conference—Atlanta — Mar. 4-6, 1956 — Biltmore Hotel.

SOMEBODY GOOFED!

The Southern Safety Fertilizer meeting pictures we made in March at New Orleans are missing. One of the boys in the shop accidentally knocked our film packs into an acid tank, ruining the film. So no "on the spot" pix. Sorry!

NEW OFFICERS ELECTED

Chairman—William H. Stone, Plant Superintendent, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.

Vice-Chairman—Quentin S. Lee, Assistant Manager, Cotton Producers Association, Atlanta, Ga.

Recorder—M. J. Hattier, Southern Cotton Oil Company, New Orleans, La.

NOMINATING COMMITTEE

Vernon S. Gornto, Manager, Insurance Dept., Smith-Douglass Co., Norfolk, Va., Frank Kruck, Safety Director, Virginia-Carolina Chemical Company, Richmond, Va., Mike Ellison, Mississippi Chemical Corp., Yazoo City, Miss.

shields should be a requirement on any worker handling these liquids, especially when connecting or disconnecting tank cars, or making repairs to the handling system. Inadequate car plates and hard rolling hand trucks have caused many a back strain and injured arms and legs, to say nothing of what they do to the efficiency of the men. Good maintenance and safety go hand in hand, paying high dividends in longevity of men and machines. The abuse of equipment by workers should not be tolerated. Show me a man who abuses equipment and I will show you a man who is sooner or later going to be involved in an accident, if not to himself, then to a fellow worker.

It is elemental that it is the worker who must be reached to make the safety program go. He must realize that it is **his** program, that you and your foreman expect him to participate 100% by performing every task safely, and that the well-being of his fellow worker is his responsibility, as well as yours.

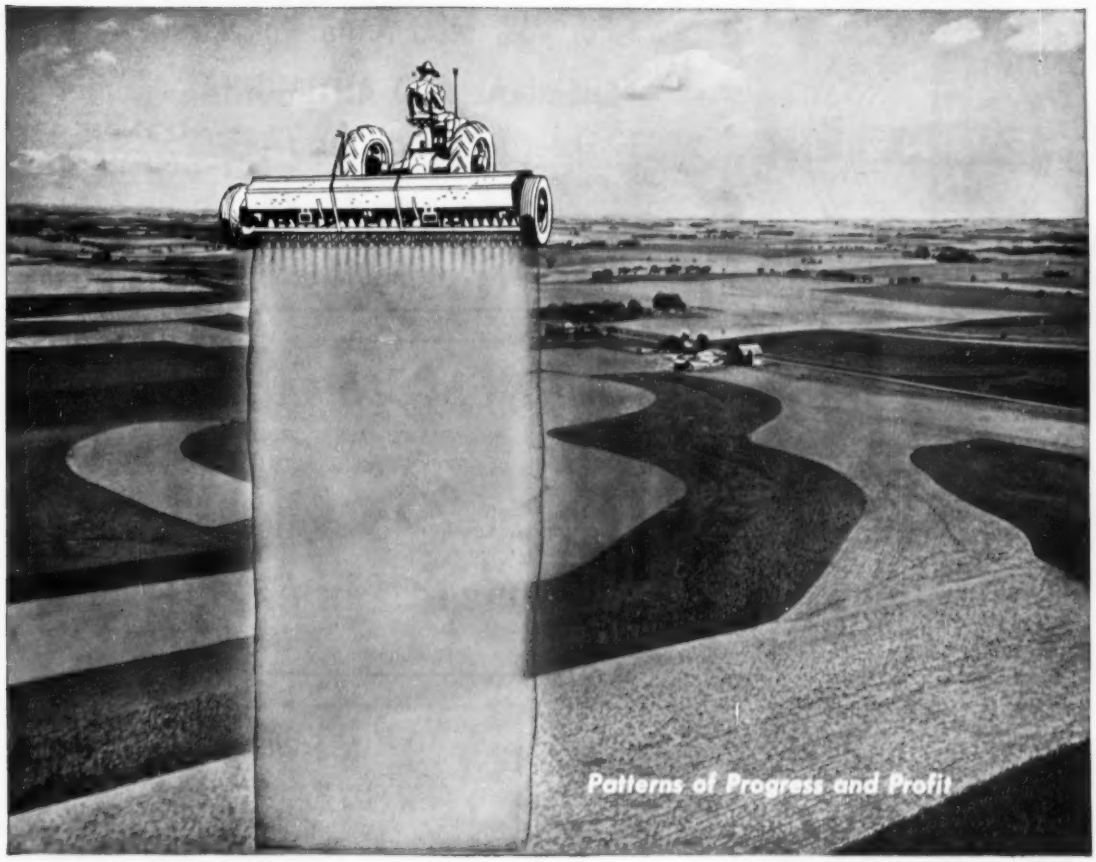
Earlier in this talk I said that the costs of a safety program were time and money, the amount of both of these being not necessarily prohibitive. We should add a third cost—men. Assuming he is already an employee and doing gainful work and doing it safely, he is not a "cost," he is a "profit." Why not keep him so?

The actual mechanics for setting up a workable safety program for the small plant are few and should consist of the following:

1. A safety-conscious top management
2. Direct placement of responsibility
3. A planned safety organization, including:
   (a) Safety committee
   (b) Investigation of accidents
   (c) Plant inspection
   (d) Good housekeeping
   (e) First aid
   (f) Safety bulletin boards
   (g) Accident records and reports

This program is certainly not original with me, nor is it an untried program. It is working now, not only in this industry, but in many industries, in many states. You can make it work for you.

As the conclusion of this little presentation, suppose we stop and take a look at what has been covered. We have discussed what safety is and what it does. To make the program go, we have to have an interested management, a delegation of authority, the cooperation of the workers. For this, we get in return, a reduced number of accidents, a saving of property, a reduction of costs, improved working conditions, better employee relations. I could stop here and our argument would be proven, but I should like to make one more, and to me the most important, point. It isn't what we get out of the program—rather what do we give **to** it. In dedicating yourselves to this safety work, you make an invaluable contribution to your fellow-workers, making the tasks more pleasant, the environment brighter, the jobs more secure and your plant the best place in the world in which to work.



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Calcium Carbonate —Equivalence	96.70%

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EACH TON OF MASCOT LIMESTONE CONTAINS ABOUT

3.6 Lbs. Zinc	.75 Lbs. Manganese
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SAFE BLASTING PRACTICES

Presented At Safety Meeting *By* ALTON L. FOSTER

International Minerals & Chemical Corp.

Those of you who saw the bowl games on television will recall how often the announcer referred to the calling of defensive signals. As the outcome of these games depended largely upon the effectiveness of these defensive plays, so the outcome of any blasting program depends upon the effectiveness of the safe methods and procedures set up.

We may well compare this program to a football game between two major teams. We are the coaches of the Fertilizer team and must make preparations for the big game with our arch-rival "Blasting." Now a good offense is usually considered the best defense but in this game the only offensive we can muster is in the setting up of an effective defense. We may score every time we get the ball and still lose the game if we allow "Blasting" to score even one Safety.

None of us like to lose. We talk of being good losers and brag about being good sports but it just isn't in the American tradition to accept defeat graciously. Since this is our nature let's scout this team thoroughly and then set up a defense which will effectively block their plays.

This won't be easy as their team lines up as follows: Ends: Carelessness and Indifference; Tackles: Transportation and Storage; Guards: Loading and Firing; Center: Improper Tools; Fullback: Regular Dynamite; Left Halfback: Electric Exploder; Right Halfback: Fertilizer Pile; Quarterback: Faulty Training. I'm sure you will agree that this is quite an imposing bunch of players and a team not to be taken lightly.

As their backfield seems to be of All American caliber, let's begin our scouting with the Fullback. Regular dynamite, the kind used in our industry, is a high explosive consisting essentially of nitroglycerine absorbed in an inert material in order to reduce its sensitivity to shock. Its strength is expressed in percentage of nitroglycerine content—as 20, 40, 60%. It cannot be exploded by sparks. Yet, the fact that a small quantity will often burn quietly has led to the dangerously mistaken notion that mere heating will not cause an explosion. It is chiefly a question of temperature. If the quantity ignited is large enough to heat the entire mass to the detonating point (say 360°F.) before all is consumed, an explosion will result. Furthermore, dynamite, when even moderately heated, becomes extremely sensitive to shock.

Like nitroglycerine, the common dynamites freeze at a temperature of from 42° to 46° F. They are then comparatively safe. When frozen at ordinary temperature even the strongest detonating caps may fail to develop the full force. To prevent freezing, dinitrobenzene or nitroglycol is now incorporated into dynamite. At very low temperatures dynamite again becomes sensitive to shock. So it follows that because of its variable sensitivity to shock dynamite is unpredictably dangerous and should be handled with the utmost caution and respect. Never allow yourself to underestimate the power of this fullback. His scoring potential is in every play.

Next, the left Halfback, Electric Exploder. Small, lean and wiry, this scatback is a very deceptive player. The low-voltage electric exploder is the one commonly used. The small copper tubes are filled: first, with a layer of pressed fulminate; second, a layer of loose fulminate in which the electric fuse is bedded; third a layer of asphalt and sulphur; fourth, a layer of asphalt; and finally, is sealed off with a layer of sulphur.

The electric fuse consists of a pair of fine, insulated copper wires, several feet long and about 1/40 of an inch in diameter. The ends of these fuse wires are connected by a fine platinum filament and explosion results from the heat generated by the electric current passing through the filament. They are not as lethal as dynamite but their power to maim is tremendous. Instances are recorded of their having been exploded from the heat generated by a closed hand. They are also sensitive to shock and should be handled with extreme caution.

The right Halfback, Fertilizer Pile, is big, awkward and ungainly looking. In fact he appears so docile you are very apt to underestimate his ability. He seldom telegraphs his intentions by any sign of movement or warning of any kind but when he does strike it is with unbelievable speed. Here again we find a variable. Different degrees of hardness, or set, in the piles of various analyses makes each a problem unto itself. Some break up into large lumps with dangerous overhangs while others are easily undercut and fall when least expected. You simply have to watch this player and keep him bottled up at all times.

The Quarterback, Faulty Training, runs the team with unerring precision. Unless his ability is counteracted by the proper training and instructing of the blaster he will score in almost every game.

The Ends, Carelessness and Indifference, are truly of All American caliber. Let me say this in an off-the-record statement, as it might not be considered ethical—get them out of the game at all costs. What if it does mean a fifteen-yard penalty for unsportsmanlike conduct. If they stay in you are certain to lose the game.

Now, I'm sure you know the other players well enough to permit our going ahead with the planning of our defensive strategy.

Never transport dynamite and exploders together. If transporting by truck or car they should be moved in separate vehicles. If necessary, make two trips. Each is dangerous by itself but when brought together the danger is more than doubled.

The storage magazine should be constructed wholly of brick, concrete or cement block. It should be bullet-proof and should have openings only for ventilation and entrance. The door should be constructed of no less than three thicknesses

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Acid Weigh Scales **Batching Hoppers**

Belt Conveyors — Stationary and Shuttle Types

Bucket Elevators **Hoppers and Chutes**

STEDMAN FOUNDRY & MACHINE COMPANY, INC.
Subsidiary of United Engineering and Foundry Company
General Office & Works: AURORA, INDIANA

John W. Manning, president of Tri-State Chemical Co. at Henderson, Ky., had already carved out an interesting and varied career before selecting the fertilizer industry as the nation's most promising field and helping to organize the firm which he now heads. He has taught public administration at Vanderbilt University for three years and at the University of Kentucky for ten years before he actively entered public administration as commissioner of finance for the state of Kentucky, which post he held for four years, and as director of the Office of Price Stabilization for Kentucky for another four years. Meanwhile, he had acquired his Ph.D. degree and written a textbook, "The American's Government," which is the standard civics textbook for the twelfth grade in Kentucky's schools. More recently, Mr. Manning served for a year as administrative assistant to the senior senator from Kentucky in Washington . . . where he became interested in the fertilizer business. As he tells it, it was during a round of golf that someone in the industry "sold" him on the potential that exists. A little snooping revealed that Henderson was geographically and economically ideal as the site for a mixing plant . . . so here he is. Dr. or Mr. Manning is also known to many as Colonel Manning, for he has been commanding officer of an Army reserve unit in Louisville, where he formerly lived.

of 7/8" tongue and groove hardwood planks bolted to 3/8" steel plate and should be kept closed and locked. On the outside the words MAGAZINE — EXPLOSIVES—DANGEROUS should be conspicuously posted.

If unbarricaded, the magazine should be placed not less than 360 feet from an inhabited building, 220 feet from a public railway or 110 feet from a public highway. If there is a natural or artificial barricade between the magazine and the building, railway or highway, these distances may be halved.

This barricade should be of such height that a straight line drawn from the top of any side wall of the magazine to any part of the inhabited building or to any point 12 feet above the center of the railroad or highway will pass through the barricade. An artificial barricade should consist of earth or sand fill with a minimum top width of three feet. Either one or both sides should be supported by concrete, masonry or timber walls.

Store dynamite cases flat, top side up, so the cartridges lie flat and do not stand on end. Use the oldest stocks first. When receiving new consignments, arrange stocks so that the balance of the old stock will be most accessible. Open the dynamite cases outside the magazine and, if of wood, use a wooden wedge or mallet in the process. Destroy empty cases by burning out of doors —never burn them in a stove. Electric blasting caps should be stored in a cool, dry safe or magazine well away from the dynamite magazine and this should be kept locked.

When blasting, the Foreman should instruct the blaster where to bore and tell him the amount of the charge to be used. Then, before starting the bore, the blaster should check the pile from all angles to be certain there are no dangerous overhangs or undercuts which might cause a fall of material in sufficient quantity to cause injury. I think it preferable and I believe better results are obtained from holes drilled horizontally 5 to 8 feet in the pile. However, if dangerous conditions are found, the hole should be bored from the top.

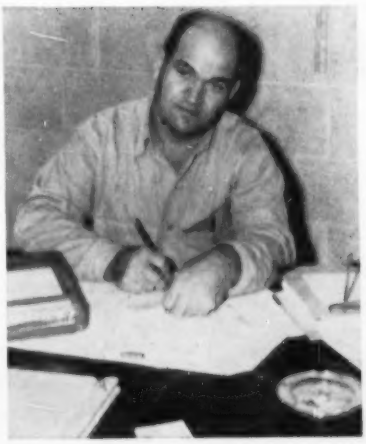
Dynamite and electric exploders should be carried to the boreholes in separate small, wooden boxes and should be kept apart until the last possible moment. Only enough dynamite and caps for the shot being made should be removed from storage. All priming operations should be made at the borehole. The cap should be placed in the center of the cartridge parallel to the long axis. Then a halfhitch of the fuse wire should be thrown around the cartridge so the cap will not be pulled out.

The placing of the fused cartridge is a matter of individual preference though it should never be the last cartridge placed in the hole. We prefer placing this fused cartridge near the center of the charge.

Tamping should be done by applying constant pressure—do not pound. The blaster should not stand directly in line with the hole while tamping. He should stand to the side so that in event of a premature explosion he would at least not have the tamping stick shot through him.

Before firing the blaster should always make certain that no other employees are in the area. He should then pick his place of cover and connect the lead wires to the blasting machine. Then, before actually making the shot, he should give a final warning by a loud yell or other audible signal.

Before other employees are permitted back in the area the pile should be checked for overhang or other dangerous conditions. These should all be cleared away before the all clear signal is given.



Hoke Smith is manager of the Tri-State Chemical Co. plant at Henderson, Ky., just completed last spring. A veteran of 17 years in the industry, he started out with F. S. Royster Guano Co. in his native state of South Carolina, and was later with Southern Fertilizer & Chemical Co. at Atlanta before coming to Kentucky to work for Bartlett & O'Bryan Fertilizer Co. in Owensboro. Hoke and Mrs. Smith moved to Henderson early last year, and liked it from the very first day. Busy as he's been, he manages to keep adding to the fine collection of wooden salt and pepper shakers that are his chief hobby. Hoke has been interested in the industry most of his life, even before coming into it, for he was reared on a farm back in Carolina and took an agricultural course in school. He was delighted at being chosen to manage the Tri-State operation, never having worked in a new plant prior to this. Already some additions have been made, and Hoke showed us the new unloading elevator for bulk goods which his crew installed during the winter slack. This spring, he predicts, the plant will do a good business in custom application; their spreader truck has been driving around the countryside with advertising banners on the side when it wasn't busy distributing mixed goods on farms in the area.

Should a charge fail to fire, at least one-half hour should elapse before anyone returns to the area. An unexploded charge should never be drilled or picked out. Drill another hole two feet away and fire another charge.

Never use dynamite that has been frozen and do not attempt to thaw it.

The dynamite punch should be a pointed pin of wood, brass or aluminum and should have a wooden handle. The loading and tamping tools should be of wood. A phosphate drag handle makes an excellent tamping tool. Superphosphate is excellent for use as a tamping material.

Several makes of small, low-voltage blasting machines, capable of firing from 10 to 20 holes simultaneously, are now on the market. We are presently using a number 10 Atlas.

Regular 20% dynamite should be

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SNAP-OPEN SACKS... so easy to open that a 10 year-old girl actually outspeeds an experienced hand working with a conventional bag!

Boost Your Sales With The Bag That Offers Customers Double Economy

Economy number one: Here's a bag that opens so easily even a 10-year-old girl can open it, and this ease of handling means *faster* handling for your customers with more units per day per man!

Economy number two: Reduced product spilling means real savings for your customers when *you* use the new Snap-Open Sack, the bag your customers will begin to demand after your very first shipment.

Yes, *you* offer multiple advantages to your customers when you bag your product in the Snap-Open... advantages that will result in increased sales and customer satisfaction.

Hudson actually went out into the field and asked your customers what they wanted in a multiwall bag. Their answer: a multiwall that would open easily, quickly. The result: the Snap-Open Sack—the bag that opens in an instant, gives you pour-control from a thimble-ful to a hundred pounds, by simply opening the bag a few inches or all the way!

Be among the first in your industry to cash in on this newest multiwall bag which Hudson is pre-selling to customers in farm magazines such as Capper's Farmer and Progressive Farmer, as well as other national consumer publications.

THAN ANY OTHER BAG

PULL AND TUG DAYS of opening bags are over! Actual light tracing photo shows how knife blades and pull-and-tug method *(left)* actually waste both time and product, while easy snap motion opening of new Hudson multiwall saves time and saves product.

SIMPLE BUT DRAMATIC demonstration of Snap-Open's *controlled* pouring is seen in these two photographs. With Snap-Open, spilling is at a minimum, pour-rate can be accomplished as desired from a thin stream to a hundred pounds.

Mail this coupon for free folder and information about the Snap-Open Sack.

Hudson Pulp & Paper Corp., Dept. CF-4
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Yes, please send further information on Snap-Open Sacks and how I can use this new development to increase my sales.

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John H. Langsford, manager of the Federal Chemical Company's new plant at Danville, Ill., is a Kentuckian by birth, but has spent the past 20 years working for Federal in Illinois and Tennessee. Back during the depression, he landed a job with the company at East St. Louis through friends; later he was transferred to their Humbolt, Tenn., operation where he remained until the fall of 1953 when Federal built the Danville plant and placed him in charge. Although he hasn't had much time lately for his favorite diversion of playing golf and attending sports events, John says that he, along with his wife and 12-year-old daughter aren't at all sorry they followed the westward trend of the industry. Then, too, he's awfully well-pleased at having a new production unit to work with.

used in our plants. This strength is ample for our needs and is less apt to cause dynamite headache. When raw nitro-glycerine comes in contact with the skin it is readily absorbed, finds its way into the bloodstream and a serious headache that lasts for days results. To avoid it in handling the higher strength dynamites wear gloves.

The electric blasting caps now on the market are of good quality and seldom misfire. However, any old or unexploded caps which for one reason or another cannot be used should be deeply buried. Children are fascinated by them and many a child has been maimed for life because this simple safety measure was not followed.

The face of the fertilizer pile should always be sloped at a safe angle. A pile should never be undercut nor should an overhang be left suspended. The piles should be regularly inspected for unforeseen or unexpected cracks or soft spots which might cause a fall. After a shot the pile should immediately be inspected and any large lumps or dangerous overhangs be pushed down with hand tools. If this removal by hand is not possible another shot should be made to clear the pile.

The person to be trained as blaster should be selected with care. He should be a person who, while not afraid of dynamite, does have a wholesome respect for it. He should be a person upon whom you can rely to understand and carry out the orders given. He should be thoroughly trained and instructed in the use of dynamite before being permitted to make his solo shot. Even then he should be regularly observed and warned at the first sign of negligence. Should he then persist in careless procedure he should be promptly replaced. The safety of too many persons are dependent upon his actions for us not to be firm in our attitude toward him.

So, even though we face a truly great squad in this team, "Blasting," it is by no means an unbeatable one. By following the safety methods and procedures as outlined we can pull an upset. Let's return to our several plants with the firm determination that we will improve our safety record this year. Should yours be a record of "No Accidents," the more power to you. Let's keep it that way.

SAFETY PAYS IN DOLLARS AND CENTS

One of the larger fertilizer manufacturing companies, with multiple plants, had no organized Accident Prevention Program prior to August 1, 1947. Beginning at that time, this company has developed a very active Accident Prevention Program. The company's Accident Frequency Rate has been reduced from 41.53 to 3.92. Some skeptics may say—"That is splendid, but what does it mean in 'dollars and cents'? Just this—it has meant a savings of $699,000. Perhaps "Mr. Skeptic" may wish to know how the savings was calculated . . . that is a fair question, and we will explain just how the figure of $699,000 was computed.

To begin with, we must know how Workmen's Compensation premiums are calculated. There is a Manual Rate for each job classification. For instance, the rate for Fertilizer Factory Workers in North Carolina today is $1.164 per $100 payroll. Now each company has what is termed an "Experience Modification Rate." The Experience Modification Rate is determined by the amount of losses of the individual company caused from industrial accidents for the first **three** of the last **four** years. If the company has a Loss Record which is better than the average for all fertilizer manufacturing plants, the company has a Credit Experience. Likewise, if the company's Loss Record is worse than the average of the other fertilizer manufacturing plants it will have a Debit Experience.

The company about which we are speaking had a Debit Experience Rating of 23.6% when the Accident Prevention Program was started in 1947. This meant that the company's Loss Record for the years 1943, 1944, and 1945 was much worse than the average record for the industry. It also meant that the Workmen's Compensation Premium for the year 1947 was 123.6% of the Manual Rate. On a payroll which would have developed a Manual Premium of $50,000, which is the average Manual Premium for the company over the past seven years, the company paid a penalty premium of $11,850. By 1954 the company had an Experience Credit of 35%. The company paid only 65% of the Manual Premium. Therefore, a premium saving of $29,350 over what would have been the premium had the 23.6% credit experience of 1947 prevailed, was secured.

The average Credit Experience for the last seven years has been 26.0%. The average net saving has been 23.6% plus 26% or 49.6%. Had the company paid the Manual Rate plus the 23.6% Debit Experience, which existed when the Accident Prevention Program began in 1947, the total premium paid during the last six years would have been 123.6% of $300,000, or $370,800. The actual premium paid was only 74% of the Manual Rate, or $221,000. Therefore, the savings in Workmen's Compensation Insurance Premiums alone, for the six year period was $139,800.

This $139,800 is what the insurance companies refer to as Direct Savings. It is generally admitted by insurance companies and manufacturers familiar with Loss Experience that the Indirect Losses caused by an industrial accident are four times the direct Losses. Thus, any Direct Saving effected by an improved Safety Record is only one-fifth of the total saving. The company, therefore, had an Indirect Saving of $559,200, and a total saving of $699,000.

Illustrating with the experience of this one company which saw the light in 1947 and began an active Accident Prevention Program, we can postively say— **"Safety does pay off in Dollars and Cents."**

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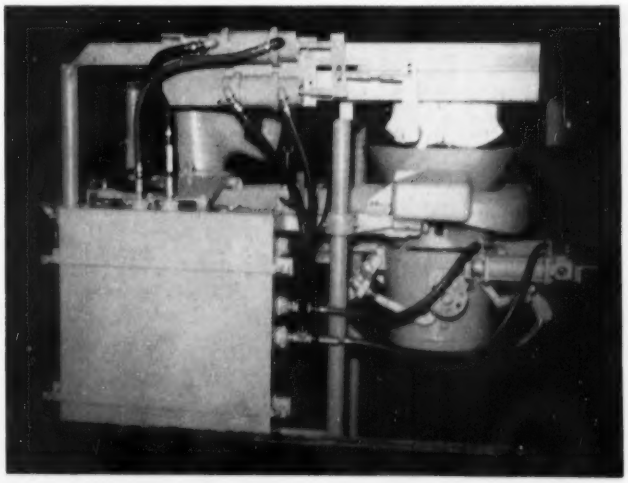


MOLONY FERTILIZER COMPANY
P. O. BOX 314 CHARLESTON, S. C. PHONE 4-5356

INDUSTRY CALENDAR

Date	Organization	Place	City
Apr. 26	CFA Conference	U of C	Davis, Cal.
June 13-15	NFA-APFC	Greenbrier	White Sulphur Spgs.
June 28-30	Pacific N.W. Conference	Boise Hotel	Boise, Idaho
July 14-15	Southwest Grade Hearings	Buccaneer Hotel	Galveston, Texas
Aug. 14-19	ASA-SSSA	----------	Davis, Cal.
Oct. 17-18	Fertilizer Safety Section	La Salle Hotel	Chicago, Ill.
Nov. 7-8	CFA	Mark Hopkins	San Francisco, Cal.

Land Fertility Bank Idea Gains Attention

Proposals to put millions of acres at least temporarily into a "land fertility bank" are getting increasing attention in Washington.

There was much discussion of the subject during Appropriations Committee hearings when House members were going over funds requests for various Agriculture Department programs.

The American Farm Bureau Federation heartily endorsed the fertility bank idea.

The central idea is that the government would make small annual payments to farmers who would agree to withdraw certain acreages from cash crop production and apply them to the latest techniques for restoring fertility.

Rep. H. Carl Anderson (R-Minn.), a leading sponsor of the proposition, suggested during the recent hearings that it might be the ideal solution for the question of what to do about acreages taken out of cotton, wheat and other crops this year.

He declared: "If we do not need the production of certain crops, why should we continue to mine our soil unnecessarily? Instead, let's put that acreage temporarily into a bank of fertility. Let us determine a real policy on how to take care of these diverted acres and our price support program will eventually take care of itself."

The proposal contemplates that farmers would receive about $10 per acre per year for land so treated and sponsors of the proposal believe that about 30,000,000 acres should be withdrawn from cash crop production.

The new "Snap-Open Sack," developed by Hudson Pulp & Paper Corp., provides a quick-opening device for multiwall bag users throughout the chemical, fertilizer, feed, grain, rock products, and a wide range of other industries. The unique feature is demonstrated above with the aid of a lighting attachment. One quick snap is all that is required to open the bag.

V. H. Ham, president and manager of Nutt & Bond, Inc. at Jackson, Ga. is a former fertilizer mixer, now a dealer. Although the plant still has mixing facilities, he decided a year ago last February that the season would be rough for mixers . . . so he arranged to operate as a dealer for bagged goods produced by other firms. Mr. Ham went to work for Nutt & Bond "18 or 20" years ago and later bought out his employer. After a wartime term in the Navy (he showed us a shipboard picture of himself with a six-month growth of beard), he returned to his native town of Jackson, where he and Mrs. Ham now reside. His favorite pastime is—you guessed it—farming.

Fertilizer Holds Key To Civilization

How long American civilization lives depends upon how much romance American farmers find in fertilizer, a businessman told the National Farm Chemurgic Council March 24.

J. I. Davis Jr., general manager of the Southeastern Liquid Fertilizer Co, of Albany, Ga., said he believes U.S. civilization will last longer than ancient ones.

This is so, he said, because farmers know "there's an element of romance in full bellies and comfortably clothed bodies."

They also know, Davis said, that how much food and clothing Americans can afford is tied closely to farm management and soil conservation, including fertilizers.

Davis told the 20th annual meeting of the Council that historians have attributed the fall of ancient civilizations to destruction of fertile lands. When the soils were worn out, civilizations died or moved to virgin land.

But he said this fate need not befall America because farmers are aware of their responsibility to care for their lands and turn them over to the next generation in good condition.

New Link-Belt Catalog On Vibrating Screens

A complete line of vibrating screens for medium and heavy duty screening operations is described in

a new 12-page book No. 2554, by Link-Belt Co. Used for scalping, sizing, dewatering and rinsing, these screens can handle many types of materials.

This book contains valuable engineering information—including capacity charts—to aid in selecting a vibrating screen for use with a given material as a specific capacity. Write to Link-Belt Co., Dept. PR 307 North Michigan Ave., Chicago 1, Ill. for a copy of Book 2554.

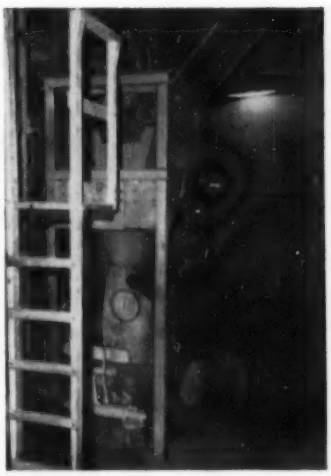
A 340-page guide to one of the most complete standard lines of power transmission and conveying equipment available. This indexed book by Link-Belt contains valuable information for the engineer or layout man in selecting standard products for new installations or for replacements. It includes data on Link-Belt's complete line of chains for conveying and power transmission, ball and roller bearings, enclosed gear drives, clutches, gears, couplings, etc. One section lists components for screw conveyors, belt conveyors, bucket elevators, overhead trolley conveyors and Flexmount oscillating conveyors. Also listed are such engineered products as vibrating screens, car icing equipment, car spotters and power unloading scoops. Tables of pre-selected assemblies, concise capacity charts and dimension tables for all standard products are included. For a copy of the Standard Products Catalog No. 950, write to Link-Belt Co., Dept. PR, 307 North Michigan Ave., Chicago 1, Ill.

Marietta Silos Now Silicone Treated

Industrial silos and storage systems manufactured by The Marietta Concrete Corporation, Marietta, Ohio, are water-proof because a special application of silicone compound is now being applied as a finishing coat. This not only entirely eliminates water seepage, but also prevents efflorescence and retards weathering and spalling.

Marietta is now using silicone treatment on all jobs that require "dry storage" such as installations for storing pebble lime, certain phosphates and all finely ground materials. The use of silicones as a silo coating also prevents staining due to soot and similar causes.

Detailed information on the Marietta silicone treated storage silos may be obtained by writing to Marietta's executive offices at Marietta, Ohio.



Kraft Bag Corporation are now marketing an automatic Open Mouth Filling Machine that combines high speed and accuracy with low cost of installation and maintenance, capable of 22 to 24 100-lb. charges a minute, with one man hanging bags, using standard size and standard type open mouth bags. Kraft Bag Corporation, 630 Fifth Avenue, New York 20, New York, is exclusive selling agent.

Fertilizers - - - and Fertilizer Raw Materials

Phosphate Rock

Superphosphates

Mixed Fertilizers

Potash

Nitrogenous Fertilizers

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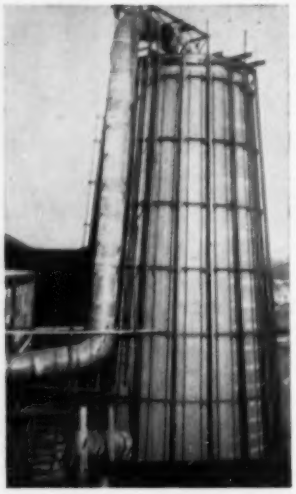

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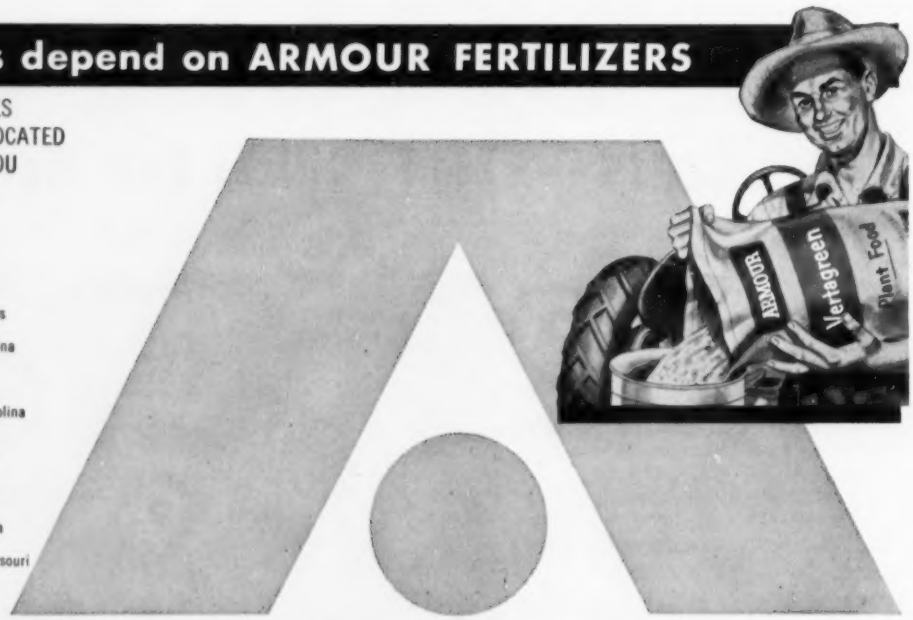

ARMOUR FERTILIZER WORKS

General Office, P. O. Box 1685, Atlanta 1, Georgia

MARKETS

ORGANICS: Market on organic ammoniates for fertilizer use continues exceedingly tight. Domestic producers of Nitrogenous Tankage are completely sold up for the season and only occasionally a car or two is available. Nominal prices are $4.15 to $4.25 per unit of Ammonia, bulk, f.o.b. production points. Imported Nitrogenous Tankage has been indicated recently for June/September, seller's option, shipment from Europe in very limited quantity at $5.75 per unit of Ammonia, in bags, exvessel Atlantic ports.

CASTOR POMACE: Price is nominally $37.50 per ton, in bags, f.o.b. Northeastern production points but practically no offerings are in the market. All of the Texas/Oklahoma production is off of the market and it is estimated that only about 3/4,000 tons were actually produced this season compared with 10/11,000 tons during the previous season. The Department of Agriculture has announced that the production and procurement program for Castor Beans in effect during the last 4 years will not be continued for 1955 which means that there will be no further price support to Domestic Castor Bean production. This probably will result in very little, if any, Castor Pomace in the western states during the coming season.

DRIED BLOOD: The Chicago market is around $6.25 to $6.50 per unit of Ammonia for unground bagged Blood. The New York market is around $6.75.

POTASH: Movement of Muriate of Potash from domestic sources is now in very good volume with demand for granular Muriate somewhat heavier than supply. Sulphate of Potash is also in strong demand with supply almost in balance. Imported Muriate of Potash is currently arriving at Atlantic ports at 52½¢ per unit K2O exvessel and Sulphate of Potash is 90/92¢ exvessel. Recent announcement from Washington is that there is no reason at present for imposing any duty on Imported Potash.

GROUND COTTON BUR ASH: Demand for this source of Potash, primarily in the form of carbonate of Potash continues steady. Material is available for current and future shipment testing 38% to 40% K2O and delivers at approximately the same price as domestic Sulphate of Potash.

PHOSPHATE ROCK: Domestic situation continues relatively unchanged. Supplies are plentiful and movement is good. Prices continue firm and steady.

SUPERPHOSPHATE: Supplies continue comfortable and demand good. Triple Superphosphate is in somewhat tight supply position.

AMMONIUM NITRATE: Some producers have exhausted available stocks and are now shipping from production. No serious tightness is noted in the market and prices remain steady.

SULPHATE OF AMMONIA: In spite of reports from some producers that they are sold up through June, there is no serious tightness in the market. Prices are steady.

NITRATE OF SODA: Supply and demand are in good balance and movement from stocks at the ports and interior production points is increasing.

GENERAL: Manufacturer activity in the Southeast is increasing as farmer demand expands. Spot shortages in small volume of Sulphate of Potash, Granular Muriate and Ammonium Nitrate appear in certain areas but over-all supply of the primary ingredients of fertilizers appears to be adequate with the exception of organic sources of Nitrogen.

BOOKS

Bear Edits Book On Soil Chemistry

What has been hailed as the first complete interpretation of the chemical processes involved in soil development, is the book "Chemistry of the Soil" edited by Dr. Firman E. Bear, and listed as ACS Monograph No. 126. It was written by 14 soil chemists, and fully covers the chemical composition of soils, the nature of soil coloids, organic matter relationships, oxidation-reduction phenomena, the problems involved in acid, alkaline and saline soils, and plant nutrition including nutrient fixation. Of special interest is a chapter on the chemistry of the trace elements, and the relationships between plant roots and the soil. Publisher: Reinhold, 430 Park Avenue, New York 22, N. Y.; Price $8.75.

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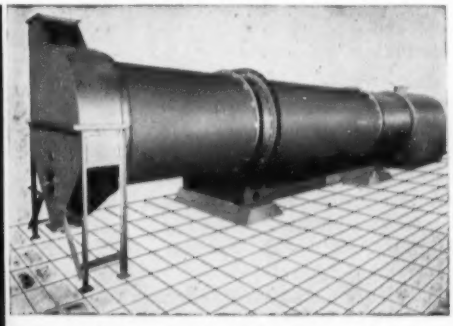

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Write for new Bulletin 854-CF

EDW. RENNEBURG & SONS CO.
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Stricter Enforcement Forecast For Odors, Fumes

In Washington, the House Appropriations Committee has approved a 37% increase in U. S. Public Health Service's air and water pollution research budget.

Meanwhile, a federal antipollution proposal that failed is being considered by the North Carolina legislature. The measure would allow five-year amortization of pollution control facilities built after 1954, and would also exempt such facilities from local property taxes after this year.

Yet there will be few, if any, representatives of our industry at the annual meeting of the Air Pollution Control Association in Detroit May 22-26 . . . though we have a bigger stake in this effort year by year, as residential areas creep closer and closer to many of our plants—and reports of "neighbor trouble" become more and more frequent.

Public demand will force more stringent regulation of industrial firms that cause unpleasant odors and fumes, a survey of law enforcement officials in major U.S. cities indicates.

The survey was conducted among regulatory officials in 67 cities by Pendray & Company, New York public relations counseling firm. A 77 per cent response was received.

Among the enforcement officials who replied to the questionnaire, 62 per cent reported specific plans to intensify enforcement efforts. A total of 68 per cent declared that public interest in odor problems is increasing, and over 40 per cent said that complaints are rising.

Industry is the major source of odor and fume problems, according to the officials, although vehicles and domestic causes rank high. In order of frequency of mention, these are the prime sources of odors and fume complaints: Chemicals, vehicles, paint and varnish, food processing, domestic causes, rendering plants, plastic, oil refineries, coke works, rubber, steel, insulation, fish, gas works, pharmaceutical, soap and detergents, and breweries.

A large majority of the officials declared that industrial firms in their area had found it both difficult and expensive to solve odor and fume problems. This, combined with a lack of objective, scientific standards on which to base regulation, has resulted in a relatively lenient enforcement program up to now, they point out.

Most of the respondents stressed the need for considerably more research into causes and cures. General satisfaction was expressed toward practically every well known method for industrial odor control, although many officials indicated a lack of personal knowledge of these techniques.

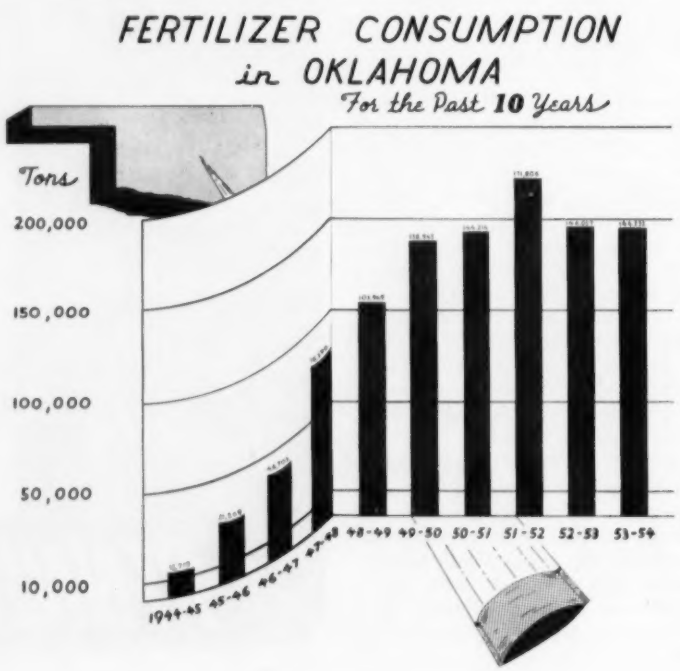
CF STAFF—COMPILED TONNAGE REPORTS

FERTILIZER TONNAGE REPORTS (in equivalent short tons)
Compiled by COMMERCIAL FERTILIZER Staff

State	February 1955	February 1954	January 1955	January 1954	December 1954	Oct.-Nov.-Dec. Quarter 1954	Oct.-Nov.-Dec. Quarter 1953	Year 1953-54
Alabama	.....	.....	33,958	42,801	20,617	189,797	83,329	1,087,763
Arkansas	35,444[1]	*	17,565[1]	*	10,951[1]	16,471[1]	*	366,225
Georgia	78,439	104,005	68,552	58,467	63,977	161,692	149,282	1,361,254
Louisiana	25,901	48,026	12,299	17,148	11,599	42,679	52,914	316,757
Missouri	42,291	119,859	26,854	33,274	20,816	120,579	116,386	756,457
N. Carolina	201,650	279,003	109,528	113,845	64,846	193,088	181,469	1,815,572
Oklahoma	13,020	21,075	5,538	5,424	2,211	28,205	24,289	144,367
S. Carolina	137,020	225,811	57,129	96,791	30,613	92,182	113,269	939,678
Tennessee	10,271	16,688	5,263	6,873	7,262	114,771	64,890	523,300
Texas	62,939	77,052	31,120	27,403	27,952	149,708	106,459	562,530
California			(reports submitted quarterly)			176,395	162,856	830,327
Virginia			(reports submitted quarterly)			81,126	80,225	780,931
Indiana			(reports submitted semi-annually[2])					1,180,091
New Jersey			(reports submitted annually)					289,614
TOTAL	571,531	891,519	350,241	402,026	249,893	1,350,222	1,135,368	10,954,866

.....(not yet reported) * Not compiled. [1] Omitted from column total to allow comparison.
[2] July-Dec. '54: 285,673 tons; July-Dec. '53: 283,987 tons.

State authorities all across the nation are doing a consistently good—and constantly improving—job of compiling, organizing and presenting fertilizer consumption data. Some have performed this service for many years, while others have only recently felt the need for such statistics. Among those leading the way is the Oklahoma Department of Agriculture, which distributes a by-county grade and materials analysis soon after the close of each quarter. This pamphlet is extremely well organized and arranged so that any desired information can be obtained from it in just a couple of seconds. We, your editors who depend on material of this sort month in and month out, feel that Oklahoma's recently-issued charts and maps booklet covering consumption for the entire 1953-54 season deserves special commendation for its clear and simple presentation. Its dozen charts, one of which is reproduced below, give in graphs, pictures and maps essential information about the progress of our industry in that state during the past decade, presented in easy-to-grasp form.



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CROP CHEMICALS

NAC SPRING MEET DRAWS 200

Some four hundred leaders in agriculture, science, government and the crop chemical industry were drawn to St. Louis March 7-9 to head such top speakers as True D. Morse, Under Secretary of Agriculture, praise the use of these chemicals on the nation's farms. As Mr. Morse said, they "have helped stabilize and expand farm production and have increased the income of farmers."

Probably the most spectacular statement was the on that

"Sharecropping With Insects," Says Entomologist

"Every farmer in the world is sharecropping with insects, but the average farmer has no idea how much the insects are getting, according to Dr. George C. Decker, entomologist of the Illinois AES. Dr. Decker added, during a panel discussion of "Better Farming with Agricultural Chemicals," that the least understood and most insidious of these pests live below the surface and attack the roots of plants.

To fight these destructive pests, the use of soil insecticides on Iowa farms has risen from application to 25,000 acres in 1952 to 600,000 acres in 1954, said Dr. J. H. Lilly, Professor of Entomology at Iowa State College, who foresaw widespread use of this new type of insecticide in the future. "Soil insecticides have been tested and proven for the control of rootworms," he said, "and some early tests indicate they may give control for two years."

Soil insecticides were also cited by Dr. Oscar N. Allen, Professor of Agricultural Entomology at the University of Wisconsin, for their "high degree of efficiency in controlling soil insect populations."

Another top authority in his field, D. A. Wilbur, Professor of Entomology at Kansas State College, said that few farmers realize how much of their stored grain is destroyed by insects, because they rarely weigh it before it is binned. Yet he pointed to laboratory tests which showed that a single granary weevil reduces the weight of a wheat kernel by approximately 55 per cent. He reported that "farmers are using insecticidal control in their grain storage program more than ever before. This includes residual sprays to treat the premises, protectants to apply to the grain as it is binned, and fumigants to kill established infestations."

Other experts predicted an increased use of herbicides on farms. Dr. Robert D. Sweet of Cornell University pointed to the high return per acre as justifying good weed control practices, and Dr. M. W. Parker, speaking for the U. S. Department of Agriculture, found herbicides a key to increased production of foodstuff with available land and farm labor.

The generally optimistic picture of the future of farming with farm chemicals was supported by Fred V. Heinkel, president of the Missouri Farmers Association, who predicted, "I have no doubt that the use of agricultural chemicals will become even more widespread in the years ahead."

The most cautious note was sounded by the chemical manufacturers themselves, who stressed the constant need for education to help the farmer get the maximum benefit from new chemicals. John L. Gillis, of Monsanto Chemical Co. urged a return to demonstration teams which formerly carried the story of agricultural chemicals from county to county. "These teams enable the farmer to evaluate new products under soil and weather and crop conditions closely approximating his own." The president of NAC, W. W. Allen, of the Dow Chemical Company, pointed to the fact that the cost of researching, patenting, and marketing a new pesticide often exceeds $1,000,000 even before the production plant is built.

On the last day of NAC's meeting, the significance of the Miller Amendment was considered closely. It was pointed out by NAC spokesman J. A. Noone that this law, which is scheduled to go into full effect on July 22, 1955, requires compliance by farmers using pesticides on farm products shipped in inter-state commerce, as well as by pesticide manufacturers. W. G. Reed, Head of the Pesticide Regulation Section of the USDA, described the Miller Amendment as a "good law—one that will result in safe uses that will win and hold public confidence."

Stauffer Expands Bayonne Plant

Stauffer Chemical Company, New York, recently completed an expansion of its Bayonne, N. J. plant for manufacturing, processing, and formulating insecticides. The expansion program includes the installation of additional units to increase the air milling capacity of the plant as well as a modern unit for the formulation of liquid insecticides.

The Bayonne operation consists of laboratories and 6 manufacturing buildings over an area of 13 acres. Captan 50-W, the new organic fungicide, is formulated and processed at Bayonne for the Eastern area. The large sulphur and grinding plant also manufactures Magnetic "70" Sulphur Paste.

Shell Releases Nemagon

Nemagon, a new soil fumigant that gives excellent control of nematodes, and has great stability in the soil, is now available for limited commercial use, it was announced by F. W. Hatch, manager of the Agricultural Chemicals division of Shell Chemical Corporation. Nemagon has already been tested on a wide variety of crops including cotton, grapes, citrus, and other tree crops such as peaches and walnuts. Some crops appear tolerant enough of this chemical so that applications can be made around the roots of the living plant.

Nemagon (1, 2-dibrome, 3-chloropropane) is currently being manufactured on pilot plant scale. Both liquid and dry formulations will be marketed in 1955. Nemagon will be available for limited sales this season on such crops as citrus, cotton, and grapes. Nation-wide marketing is expected in 1956.

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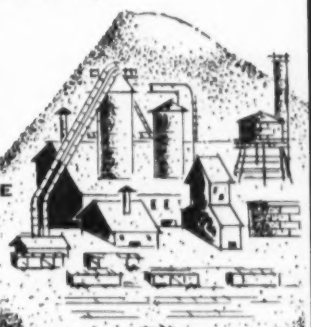

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Losses To Corn Borer In 1954 More Than Double 1953

Almost 192 million bushels of grain corn worth more than $261 million—about 7 percent of the national crop—were destroyed by the European corn borer in 1954, the U. S. Department of Agriculture estimated last month. This is more than double 1953's estimated 3-percent loss of 90 million bushels, worth more than $125 million. Last year's losses have been topped only once, in 1949, when corn destroyed by the borer was estimated at almost 314 million bushels worth nearly $350 million.

These estimates were made for 958 counties in the 25 eastern and midwestern States which produce 90 percent of the corn grown for grain. They include 60 percent of all counties known to be infested by the corn borer in this country. They are based on actual 1954 fall surveys of borer populations made by State entomological survey teams in 608 counties of the 25 States, and on losses computed for an additional 350 infested but unsurveyed counties in these States.

Iowa, Illinois, Nebraska, and South Dakota suffered heaviest losses to the insect, according to the estimates. Iowa lost almost 94 million bushels of her 1954 crop, Illinois more than 38 million bushels, Nebraska 22 million bushels, and South Dakota more than 17 million bushels.

The borer entered this country on imported broomcorn before 1917, and has since spread into 37 States, including most of the U. S. main corn-growing sections.

State-by-state losses, both in bushels and dollars (prices to farmers on December 15, 1954), are given in the accompanying table, as included in the March 25 "Cooperative Economic Insect Report," issued by USDA's Plant Pest Control Branch Agricultural Research Service.

Shell's Ag-Chem. Sales Div. Moves To NYC

Shell Chemical Corporation's Agricultural Chemicals Division will move its headquarters to New York City from Denver, Colo. around May 15, L. V. Steck, vice president in charge of marketing has announced. The Division is the sales organization for the Corporation's insecticides, aldrin, dieldrin and endrin, and the soil fumigants, D-DR and Nemagon.

While the plant for manufacture of the insecticides will remain in Denver, transfer of the Sales Division, under direction of F. W. Hatch, is designed to insure greater access to national markets and will afford better coordination of the various marketing activities.

District sales offices in Atlanta; Jackson, Miss.; Houston; New York; San Francisco and St. Louis will continue to operate under the Division. The new offices for the Division will be located at 460 Park Avenue.

American Potash Gets Safety Council Award

American Potash & Chemical Corporation has been presented an Award of Honor by the National Safety Council for the company's safety record set during 1954. This is the Council's highest award.

The 1954 accident rate was the lowest in the company's history and was 89 per cent lower than the Safety Council's so-called "par accident rate."

The rate is set by a system of computation based on the particular company's previous accident rate and the accident rate for the chemical industry as a whole.

In achieving the mark, American Potash & Chemical Corporation held lost-time accidents to a low frequency of 2.1 as opposed to the par rate of 5.0.

Table 1. Estimates of damage by the European corn borer to corn grown for grain in the United States in 1954

State	Counties		Estimated data				
	Known to be infested[1]	Included in estimate	Total State Production	Value per bushel	Value of production	Loss of crop	
	Number	Number	1,000 Bu.	Dollars	1,000 Dol.	1,000 Bu.	1,000 Dol.
Connecticut	8	8	188	1.75	329	Trace	1
Delaware	3	3	5,115	1.48	7,570	108	160
Illinois	102	102	429,116	1.31	562,141	38,242	53,922
Indiana	92	92	247,652	1.36	336,806	3,123[3]	4,247[3]
Iowa	99	99	521,640	1.36	709,430	93,950	127,772
Kansas	88	25	31,388	1.45	45,512	164	238
Kentucky	98	98	63,860	1.40	89,404	1,012	1,416
Maryland	23	23	16,400	1.51	24,764	167	252
Massachusetts	14	1	184	1.75	322	Trace	1
Michigan	51	17	69,476	1.36	94,487	552	750
Minnesota	87	69	242,476	1.24	300,670	5,697	7,064
Missouri	112	47	59,560	1.47	87,553	1,053[4]	1,548[4]
Nebraska [2]	83	33	188,160	1.40	263,424	22,000	30,800
New Hampshire	9	7	86	1.75	150	Trace	1
New Jersey	21	12	6,864	1.58	10,845	51	81
New York	60	17	9,636	1.56	15,032	8	13
North Dakota	44	18	10,633	1.19	12,653	167	199
Ohio [2]	88	88	212,976	1.40	298,166	6,517	9,124
Pennsylvania	67	67	49,680	1.56	77,500	268	419
Rhode Island	5	5	33	1.75	58	Trace	1
South Dakota	63	41	102,388	1.25	127,985	17,650	22,063
Vermont	14	5	84	1.75	147	Trace	1
Virginia	92	7	26,004	1.64	42,646	112	183
West Virginia	51	3	8,055	1.49	12,001	2	3
Wisconsin	71	71	96,360	1.50 [2]	144,540	771[2]	1,156[2]
Total	1,445	958	2,398,014	-	3,264,135	191,614	261,415

[1] Does not include 151 counties in 12 other States for which estimates were not made.
[2] Estimates prepared by States; production and crop values differ slightly from December 15 AMS reports.
[3] State estimate of damage used in computing loss.
[4] Adjusted loss prepared by State.

Classified Advertising

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

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Vernon Mount says...

AUTOMATION--the mechanization of every possible process--is a joyful prospect to management and a bogey-man to labor. But that has been true since the invention of the wheel.

CLASSIC EXAMPLE--the spinning frame, which English workers destroyed with hammers. Yet within a very few years the lowered cost of woolens jumped the market so that many more workers were employed than under the old, slow, hand method. Workers have trouble visualizing this fact, but it is a fact.

HIGHER LIVING standards follow automation because it produces more for the money, so people buy more, so industry makes more, so more workers are needed. And that doesn't take into consideration the workers needed to make the automatic equipment.

THE REAL BOGEY-MAN should be the problem of those who do not convert to automatic equipment. They will not be able to compete, because their prices will be too high. They will become what the economist calls "marginal". They will eventually go under to the highly mechanized competition. Their workers should recognize this, too--and encourage automation where they work...so they can keep on working there!

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